TRANSPORTATION LIBRARY

NOV 10 1930

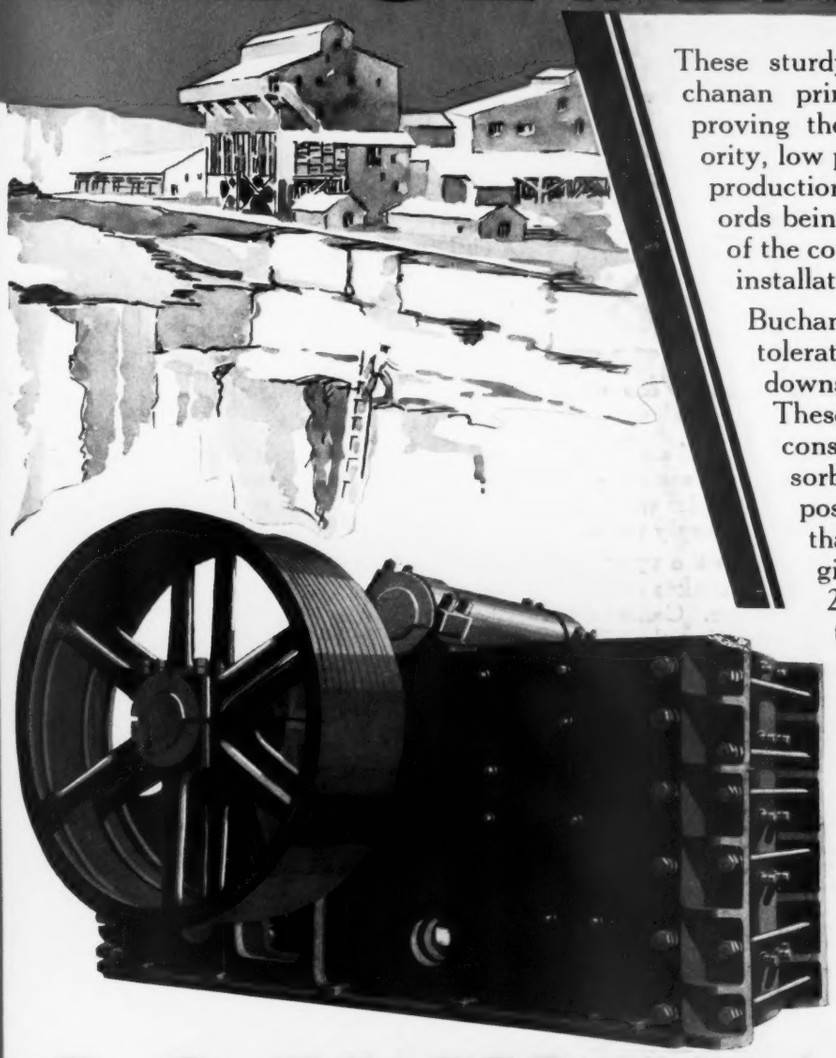
Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS

Founded 1896

Chicago, November 8, 1930 | Issued Every Other Week | Volume XXXIII, No. 23

BUCHANAN



These sturdy Type "C" Buchanan primary crushers are proving their claim to superiority, low power costs and high production through actual records being established in many of the country's most important installations.

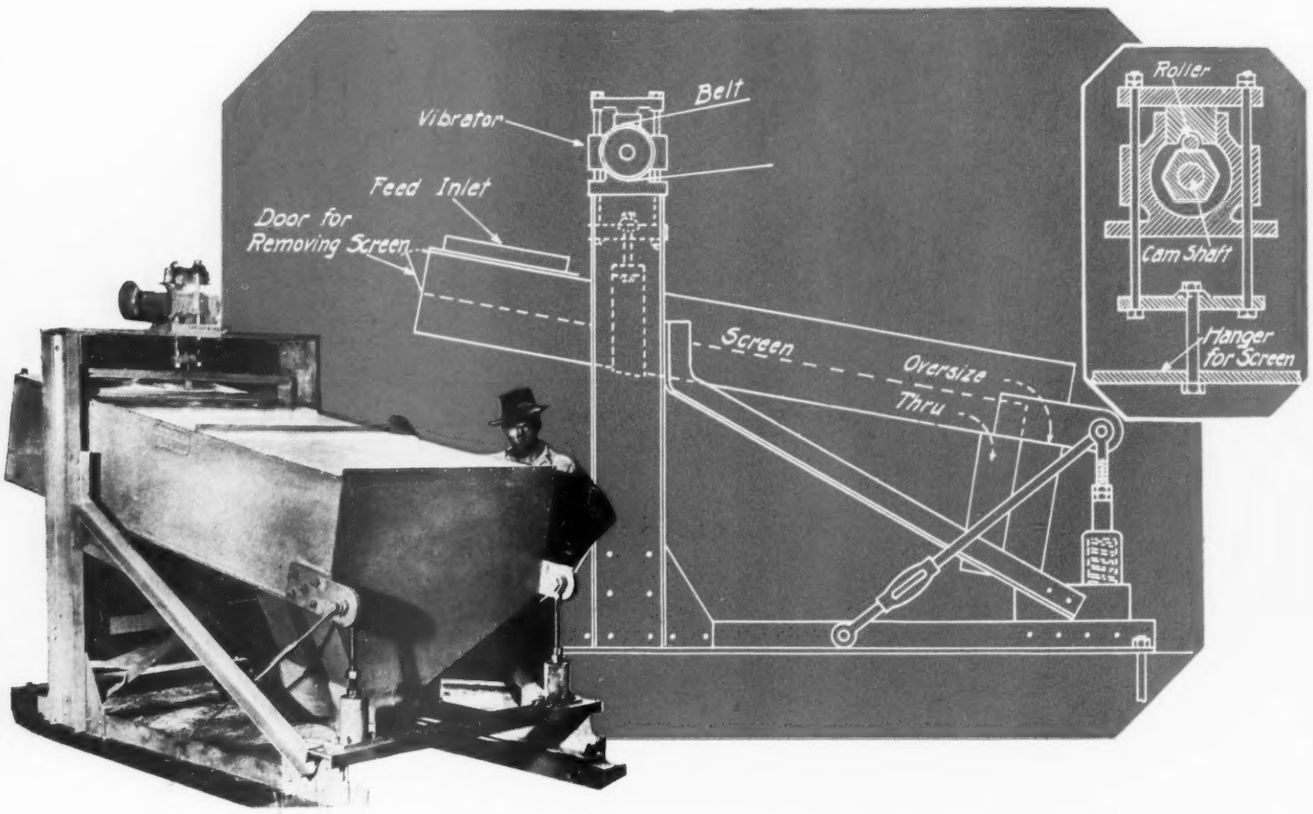
Buchanan users do not have to tolerate losses due to shutdowns, and costly maintenance. These dependable crushers are constructed to indefinitely absorb the tremendous strains imposed upon them. The fact that some of these crushers are giving excellent service after 21 years of continuous operation is convincing proof of their ability to stand up under gruelling work over a long period of years.

Buchanan Type "C" Crushers are built with jaw openings ranging from 24 x 36 in. to 56 x 72 in.

C. G. BUCHANAN CO., Inc.

90 WEST STREET - - - - NEW YORK, N. Y.

Member of A. B. C. (Audit Bureau of Circulations) and of A. B. P. (Associated Business Papers). The Oldest Publication and Recognized Authority in This Industry. Net Printing of This Issue 6,000 Copies.



"We are glad to testify to about 3 years results of the "KAM-TAP" improved vibrating ore screen. Previous to its use we had been using other screens and found it impossible to screen the rock as the vibration did not seem to adjust the movement to let the rock pass through. Before the use of the "KAM-TAP" we kept men busy a greater portion of the day repairing the screens more or less, as they would get clogged up or a severe jar would cause a bolt or some portion to break after accumulating a very heavy load of rock, or at times the load would cause the screens to stop entirely. The cost of the labor and repairs, to say nothing of the delay, was quite an expensive item. From the time the "KAM-TAP" was put in use some 3 years ago, our troubles have disappeared."

Annapolis Lead Co.,
Annapolis, Mo.

The "KAM-TAP"
(PATENTED)
Vibrating Screen

The "KAM-TAP" employs the most simple and practical method yet devised for vibrating screening equipment. The entire screen frame is suspended from the cam roller which as it rides over the cam points at high speed causes the screen to sharply rise and fall, setting up an intense vibration.

Material enters the upper end and is tumbled over and over by the violent motion which shakes out the fines and prevents oversize material blocking the screen openings. Cams with from 4 to 8 points are available and are interchangeable so that the vibration can be regulated as to speed, range of throw and intensity.

"KAM-TAP" screens are built in several popular sizes and for belt or direct motor drive.

Williams Patent Crusher & Pulverizer Co.
800 St. Louis Avenue, St. Louis, Mo.

CHICAGO	NEW YORK	SAN FRANCISCO
37 W. Van Buren St.	15 Park Row	337 Rialto Bldg.

THE WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS, MO. U.S.A. TRADE MARK
REG U.S. PAT OFF

Williams
OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
PATENT CRUSHERS GRINDERS SHREDDERS

When writing advertisers, please mention ROCK PRODUCTS

Plan now for next year—
Check your equipment!

NOW is the time to think about renewing and adding to your equipment for next season's operations. Do it while you are still running and before you shut down for the winter. A bit of planning now will assure maximum, uninterrupted production when you start up next year.

Link-Belt engineers, long experienced in sand and gravel production, are at your service. Link-Belt equipment for excavating, screening, conveying, elevating, sizing and washing is universal in the industry.

Send for this Book

Every producer will find something of real interest in this 72-page book. It contains data of practical use—the latest designs and most modern methods of sand and gravel production. Return the coupon.

LINK-BELT
Sand and Gravel Washing Equipment

LINK-BELT COMPANY 4116
300 W. Pershing Road Rock Products
Chicago

Send me a copy of book No 640.

*Name*_____

*Firm*_____

*Address*_____

*City*_____ *State*_____

Recognized the World Over as the Leader in Its Field

Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Entered as second-class matter, July 2, 1907, at the Chicago, Ill., postoffice under the Act of March 3, 1879. Copyrighted 1930, by Tradepress Publishing Corporation

Contents for November 8, 1930

New Wisconsin Gravel Plant Designed for Special Products 33-35
Small but strictly up-to-date operation of Waupaca company supplies railway ballast and special silica sand as well as ordinary commercial aggregates. By Gordon F. Daggett.

Researches on the Rotary Kiln in Cement Manufacture 36
Part VII—The dimensions of rotary kilns, including rules for finding their lengths and diameters, and sizes of decarbonating, preheating and drying zones of both wet and dry process kilns. By Geoffrey Martin.

Rock Products Developments in Michigan and Wisconsin 37-52
Stone, lime and cement industries are closing active season—much new production is in sight. By Earl C. Harsh.

Gypsum and Gypsum Products Manufacture 53-55
Part V—Factors which affect tensile strength; effect of aging; artificial aging; tests to determine the degree of calcination. By S. G. McAnally.

Western Pennsylvania's Newest Crushed Slag Plant 56-61
Cashion Slag Co., Donora, has compact and simplified screening practice as outstanding feature.

Output of Carbon Dioxide Ice Doubled Since 1927 65

Analysis of Complicated Concrete Mixes 62
By J. L. Heitzman.

Weight of Slurry 64
By E. Taylor.

North American Cement Corporation Plants Celebrate No Accident Year 81
By A. R. Couchman.

Eliminating Accidents at the Plant of the Superior Portland Cement, Inc., Concrete, Wash. 83
By H. A. Ambler.

New Lime Plant Nearing Completion in Eastern Pennsylvania 88-89

Departments

Chemists' Corner 62-64
Hints and Helps for Superintendents 66-67
Editorial Comment 69
Financial News and Comment 71-72
Traffic and Transportation 74-76
Book Review 77
Foreign Abstracts and Patent Review 78-79
Pertinent Paragraphs 86
Cement Products 90-97
News of the Industries 65, 68, 72, 73, 80, 87, 97
Rock Products Market 98-101
New Machinery and Equipment 102-103
News of All the Industry 104, 106
Classified Directory of Advertisers 114-120

(Rock Products is indexed in the "Industrial Arts Index," which can be found in any Public Library)

TRADEPRESS PUBLISHING CORPORATION
542 South Dearborn Street, Chicago, Illinois, U. S. A.

W. D. Callender, President; N. C. Rockwood, Vice-President; C. O. Nelson, Secretary

LONDON OFFICE: Dorland House, Mezzanine Floor, 14 Regent St., S.W. 1.

NATHAN C. ROCKWOOD, *Editor and Manager*
EDMUND SHAW, Los Angeles, Calif., *Contributing Editor*
EARL C. HARSH, WALTER B. LENHART, *Associate Editors*
A. M. STERN, *Assistant Editor*
E. A. SINE, *Production Manager*

FRED S. PETERS, CARL L. WALKER, *Eastern Representatives*
280 Madison Ave., New York City. Tel. Caledonia 4474
GEORGE M. EARNSHAW, *Central Advertising Manager*
1374 West Blvd., Cleveland, Ohio. Tel. Woodbine 8031
RALPH C. SULLIVAN, *Advertising Manager*
NORMAN BOGGS, JAY BOHN, *Western Representatives*
Chicago. Tel. Wabash 3714-3715

SUBSCRIPTION—Two dollars a year to United States and Possessions. Three dollars a year to Canada and foreign countries. Twenty-five cents for single copies

TO SUBSCRIBERS—Date on wrapper indicates issue with which your subscription expires. In writing, to have address changed, give old as well as new address

The A. B. P. is a nonprofit organization whose members have pledged themselves to a working code of practice in which the interests of the men of American industry, trade and professions are placed first—a code demanding unbiased editorial pages, classified and verified paid subscribers, and honest advertising of dependable products. The A.B.C. is an organization which audits and verifies publishers' circulation claims and records.

Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

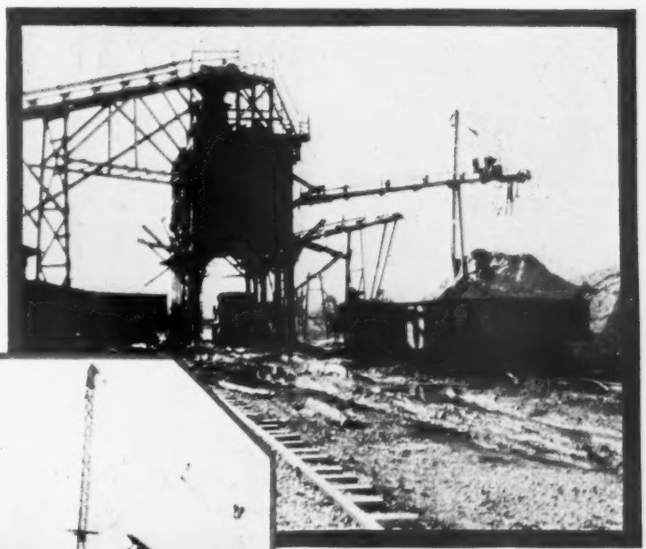
Volume XXXIII Chicago, November 8, 1930 Number 23

New Wisconsin Gravel Plant Designed for Special Products

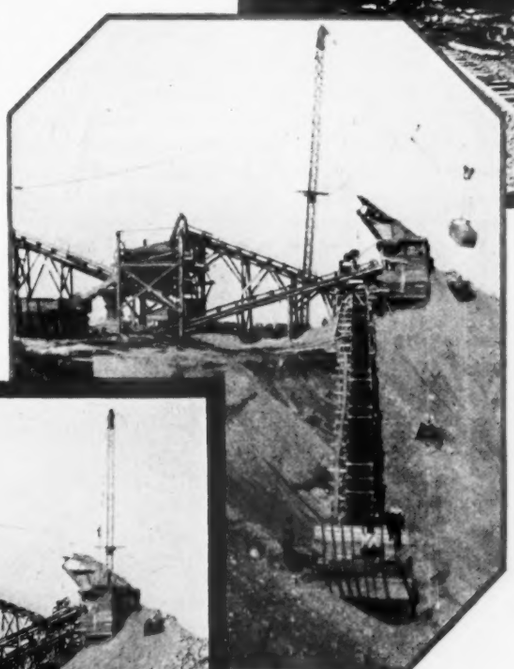
Small But Strictly Up-to-date Operation of Waupaca Co. Supplies Railway Ballast and Special Silica Sand as Well as Ordinary Commercial Aggregates

By Gordon F. Daggett
Former Secretary and Engineer, Wisconsin Mineral Aggregate Association

THE WAUPACA SAND AND GRAVEL CO., Waupaca, Wis., for several years past has been operating a plant near Amherst Junction, Wis., on leased acreage. The pit was worked with a slack-line cableway and conveyor system, furnishing a good grade of sand and gravel, but running heavy to sand. The company's lease expired and there not being enough material left in the deposit to warrant a lease renewal, the company purchased an 80-acre tract of land about four miles west of the old location and decided to build another plant, using what machinery and equipment it could from the original plant. The new plant is located on the main line of the Soo railway, within a mile of Custer station, and is now (August 15) in operation, having been constructed this last spring. There is quite a demand for railroad ballast and special silica sand in that section of the state, so the new plant was designed and built with some special features to permit of production for these special markets.



Loading bins at Waupaca Sand and Gravel Co. plant. Stock pile conveyors are at the right. Below, view showing field arrangement of units



At the left is a general view of the Waupaca plant. The conveyor in the foreground is being constructed for shovel operation

The general lay of the land is level and the known depth of good gravel varies from 45 to 65 ft. above water. Material is excavated with a Sauerman 1½-cu. yd. slack-line cableway bucket, operated by a 100-hp. Thomas, double-drum, two-speed hoist, with 500 ft. of load line. Material is discharged into a grizzlied hopper placed about 25 ft. above ground, beneath which is a 3- by 6-ft. heavy duty Chain Belt reciprocating feeder. This feeder is of exceptionally rugged construction, having been designed for mine duty. The feeder was purchased from a mine at Mayville, Wis., which has been closed down and the equipment sold.

The reciprocating feeder discharges to a 30-in. by 50-ft. centers conveyor belt, run-

ning at 250 ft. per min. and carrying material of minus 10-in. to a 42-in. diameter by 12-ft. cylindrical scalping screen. The perforations on the scalper screen are such that the minus 1½-in. material is passed through, while plus 1½-in. to minus 6-in. stone is passed into a No. 5 Austin gyratory crusher, and the plus 6-in. to minus 10-in. material is passed into a No. 7½ Gates gyratory crusher. Both crushers discharge to a common belt conveyor, 24 in. wide by 50-ft. centers, which returns the material to repeat the scalping cycle for final sizing before transportation to the main plant. The No. 5 Austin crusher is driven by a 40-hp. motor, and the Gates crusher is driven by a 55-hp. motor.

Material is transported from the scalper screen to the main plant on a 30-in. by 75-ft. centers belt conveyor running approximately 250 ft. per min., and is discharged directly into the scrubber screen. This screen is 42 in. in diameter and 16 ft. long, having a 5-ft. scrubber section with special baffles and lifting rings, an 11-ft. stone screen and a 62-in. by 10-ft. sand jacket. This exceptionally long sand jacket has various sized perforations for the purpose of producing three different sizes of sand. In fact two of these three grades are taken from the screen ready for market without additional washing or classification. Torpedo sand for concrete construction is passed into a drag type sand tank, where final washing and classification takes place.

Slack-line cableway hopper and, at the right, new field conveyor being built for shovel excavation

Practically No Bin Storage

Perhaps the most unique feature about this particular plant is the absence of large bin storage for car loading. The bins were designed with a view of simply being an aid in passing material from the screens to cars, or trucks, and therefore the capacity is just enough to permit continual operation while cars or trucks are being spotted for loading. Fine and coarse aggregate for concrete construction, when not being loaded for shipment, is passed to stockpile conveyors and carried about 40 ft. from the plant to point of discharge. Stockpiling operations are aided by a ¾-yd. Sauerman drag scraper. Reclaiming at present is done by means of a shovel and clamshell bucket.

Water is furnished from a deep well of 12-in. bore and 100-ft. depth by a Layne-Bowler deep well pump, belt-driven, which discharges directly into a 6-in. by 4-in. Worthington centrifugal pump, which is direct-connected to its motor. This pump delivers water as required at any point in the plant and is now delivering about 600 gal. per min. More water can be furnished by this unit if desired by simply speeding it up. The well has about 40 ft. of water depth, which is not lowered by the continual pumping.

Makes Its Own Electric Power

Power is furnished to the plant by a steam plant having a 400-hp. Scotch marine boiler, which runs a 325-hp. Ideal engine direct-connected to a 200-kw. direct-current generator producing electricity at 250 volts. The switchboard is wired with circuit breakers instead of fuses, and is so arranged as to be convenient to the engineer. Coal shipments are received on a slightly elevated track, which permits of semi-gravity car unloading within 20 ft. of the boiler.

Every plant unit has it own motor and transmission is in the form of steel cut back gearing and sprockets with roller chain. All gears are of very high quality.

Track facilities for loading and storage of cars are somewhat out of the ordinary for a plant of this nature. Storage has been provided for 40 empties and 23 loads, as the plant is designed primarily for washed bal-

The crusher unit, gyratory to the left

View of bins and plant. Coal unloading track at right

last. There is a loading track on each side of the bins, and trucks are loaded from the bottom. Hence two cars and a truck can be loaded at the same time. All tracks are on a heavy gravity grade, which permits of gravity movement of both empty and loaded cars. The company has a geared Stephens-Adamson car puller, but necessity for this has not yet been felt, therefore it has not been placed.

The 400-hp. boiler. Housing is not yet completed

At present (August 15) the company is making plans to change the method of pit excavation to a shovel with belt conveyors. This is occasioned by the heavy stone content in the pit. The stone in the upper 30 ft. of the deposit runs approximately 70% over ¼ in., while the next 15 ft. runs approximately 50%. The material is very clean in the pit face, but its composition is such that caving is infrequent and the face must be loosened by mechanical means.

Personnel

The Waupaca Sand and Gravel Co. maintains its office at Stevens Point, Wis., about nine miles distant. Dr. C. R. Nutt, the president, owned and operated the first gravel washing plant in Wisconsin and is therefore an experienced hand in the industry. The new plant was designed and construction supervised by the author, civil and consulting engineer, Milwaukee.

Capacity of the plant naturally varies with the run of material in the pit, but is estimated at approximately 20 to 25 cars per 10-hour day. All equipment, while not new, is of the highest quality and the general arrangement of the plant has been designed for a low cost operation. Since good gravel deposits in this section of Wisconsin are scarce, a steady market for the output of this plant is reasonably assured.

Lime in Canada in 1929

LIME PRODUCTION in Canada during 1929 reached a new high level amounting to 674,087 tons valued at $5,908,610, or 32.5% greater in quantity and 30.3% greater in value than the 1928 production of 508,889 tons worth $4,534,568, according to finally revised statistics issued by the mining, metallurgical and chemical branch of the Dominion Bureau of Statistics at Ottawa. Canadian producers received an average of $12.84 per ton for hydrated lime and $8.11 per ton for quicklime.

Of the total amount of lime produced, chemical works used nearly 45% or 298,364 tons; pulp and paper mills consumed 103,171 tons or about 15%, and a slightly smaller quantity went to the building trades. Smelters used somewhat more than 7% and of the remaining 18%, small quantities were used in sugar refineries and tanneries, and for agricultural purposes, while about 15% was sold for unspecified uses.

Considerably more than half the quantity of lime produced in Canada during 1929 was produced in the province of Ontario.

Imports of lime into Canada during 1929 were recorded at 4448 tons appraised at $49,395. Exports of Canadian lime amounted to 24,238 tons valued at $428,209.

Capital employed in the 53 plants operating in the lime industry in 1929 was reported at $7,404,677. Employment was furnished 109 salaried employes and 1273 wage-earners; their total earnings were $1,393,092. Fuel used in 1929 cost $1,114,264, of which amount $681,468 was expended for coal, $310,792 for wood, $79,607 for coke, and minor sums for gasoline, kerosene, fuel oil and gas. Electric power purchased for use in this industry cost $69,049.

PRINCIPAL STATISTICS OF THE LIME INDUSTRY IN CANADA, 1928 AND 1929

	1928	1929
Number of plants	54	53
Capital employed	$6,952,079	$7,404,677
Number of employes:		
On salary	100	109
On wages	1,118	1,273
Total	1,218	1,382
Salaries and wages:		
Salaries	$ 184,732	$ 158,604
Wages	$1,131,383	$1,234,488
Total	$1,316,115	$1,393,092
Cost of fuel and electricity	$ 912,395	$1,183,313
Selling value of products	$4,534,568	$5,908,610

Motion Picture Film Shows Wealth in Limestone

"WEALTH IN LIMESTONE" is the title of a motion picture film available from the Department of Immigration and Colonization of the Canadian Pacific Railway, Montreal, Canada. The subject covers two reels and illustrates the value and necessity of limestone in fertilization of farm lands in different provinces as well as covering the manufacture, methods of application and results of usage.

PRODUCTION OF LIME IN CANADA, BY PROVINCES, 1929, SHOWING PURPOSES FOR WHICH SOLD OR USED

Quicklime	Nova Scotia and New Brunswick	Quebec	Ontario	Manitoba and Alberta	British Columbia	CANADA
Building trades, tons	500	15,698	22,801	6,905	.....	45,904
	$6,500	$199,582	$197,172	$66,488	.....	$469,742
Chemical works, tons	2,360	63,011	232,188	147	149	297,855
	$10,264	$441,106	$1,942,318	$1,470	$2,831	$2,397,989
Glass works, tons	.....	1,585	6,924	.....	.....	8,509
	.....	$11,881	$58,814	.....	.....	$70,695
Smelters, tons	38,641	.....	9,210	838	.....	48,689
	$133,523	.....	$67,884	$8,454	.....	$209,861
Pulp and paper mills, tons	7,693	63,006	8,249	11,807	6,316	97,071
	$72,980	$409,528	$65,565	$88,997	$54,779	$691,849
Sugar refineries, tons	254	29	7,996	.....	.....	8,279
	$2,736	$216	$67,755	.....	.....	$70,707
Tanneries, tons	10	189	1,764	.....	.....	1,963
	$135	$2,520	$13,743	.....	.....	$16,398
Agricultural uses, tons	50	256	17	42	.....	365
	$525	$1,360	$135	$420	.....	$2,440
Dealers, uses unspecified, tons	3,259	13,335	17,698	7,772	2,587	44,651
	$53,105	$111,189	$155,752	$78,515	$35,322	$433,883
Other consumers, tons	.....	305	7,396	2,348	17,248	27,297
	.....	$5,766	$55,146	$21,602	$262,081	$344,595
Total quicklime, tons	52,767	157,414	314,243	29,859	26,300	580,583
	$279,768	$1,183,148	$2,624,284	$265,946	$355,013	$4,708,159
Hydrated lime						
Building trades, tons	1,050	2,809	39,617	9,549	.....	53,025
	$11,125	$23,495	$491,795	$168,254	.....	$694,669
Chemical works, tons	200	.....	309	.....	.....	509
	$2,400	.....	$3,399	.....	.....	$5,799
Glass works, tons	.....	25	.....	475	.....	500
	.....	$219	.....	$6,021	.....	$6,240
Pulp and paper mills, tons	2,750	3,300	50	.....	.....	6,100
	$26,950	$29,229	$575	.....	.....	$56,754
Tanneries, tons	2	54	54	.....	.....	110
	$30	$547	$594	.....	.....	$1,171
Agricultural uses, tons	250	1,115	534	.....	497	2,396
	$3,000	$9,113	$5,738	.....	$3,423	$21,274
Dealers, uses unspecified, tons	500	2,175	15,276	.....	.....	17,951
	$5,467	$18,443	$237,156	.....	.....	$261,066
Other consumers, tons	.....	.....	75	44	12,794	12,913
	.....	.....	$870	$452	$152,156	$153,478
Total hydrated lime, tons	4,752	9,478	55,915	10,068	13,291	93,504
	$48,972	$81,046	$740,127	$174,727	$155,579	$1,200,451
Grand total, lime, tons	57,519	166,892	370,158	39,927	39,591	674,087
	$328,740	$1,264,194	$3,364,411	$440,673	$510,592	$5,908,610

Researches on the Rotary Kiln in Cement Manufacture†

Part VII—The Dimensions of Rotary Kilns, Including Rules for Finding Their Lengths and Diameters, and Sizes of Decarbonating, Preheating, and Drying Zones of Both Wet and Dry Process Kilns

By Geoffrey Martin

D.Sc. (London and Bristol), Ph.D., F.I.C., F.C.S., M. Inst. Chem. Eng., M. Inst. Struct. Eng., M. Soc. Pub. Analysts, F. Inst. Fuels; Chemical Engineer and Consultant; Former Director of Research of the British Portland Cement Research Association; Author of "Chemical Engineering"

THE SIZE of the clinkering and decarbonating zones can be calculated from the radiatory constants alone.

In the case of the preheating zone, and drying zone, however, much of the heat-transfer takes place through convection and conduction, radiation playing a progressively smaller part as the temperature decreases.

So that theoretical deductions of their respective sizes are difficult.

However, as a matter of empirical experimenting, it has been found that the following formulas give approximately correct results in the case of the wet process employing 40% slurry moisture:

Let L be the total length of the kiln, and consider it to be divided up as in the diagram.

Then

$$\textit{Cooler end} = 0.0952L = \frac{2}{21}L \text{ approximate}$$

$$\textit{Clinkering zone} = 0.1905L = \frac{4}{21}L \text{ approximate}$$

$$\textit{CO}_2\textit{-Expulsion zone} = 0.2381L = \frac{5}{21}L \text{ (say, } \tfrac{1}{4}L\text{)}$$

$$\textit{Preheating zone} = 0.1429L = \frac{3}{21}L$$

$$\textit{Drying zone} = 0.3333L = \frac{7}{21}L \text{ (say, } \tfrac{1}{3}L\text{)}$$

Cooler end	Clinkering zone	CO_2-Expulsion zone	Preheating zone	Drying zone
$\frac{2}{21}L$	$\frac{4}{21}L$	$\frac{5}{21}L$	$\frac{3}{21}L$	$\frac{7}{21}L$

Ratio of Length of Kiln to Diameter

WET PROCESS—If d' be the diameter in feet of the kiln, brick face to brick face, and if L feet be its length, a good rule is

$$\left.\begin{matrix} L = 27d' \text{ minimum} \\ L = 29d' \text{ maximum} \end{matrix}\right\} \quad . \quad . \quad . \quad (1)$$

The trouble is how to determine d'. A formula which the writer has worked out and which allows for the fact that the larger the diameter the smaller the relative cooling surface prescribed, and which gives very reliable results, is this:

$$L = 25(d - 1.5) + 0.2\,(d - 1.5)^2 \,. \quad (2)$$

when L is the length of the kiln in feet.

d is the diameter of the iron shell in the decarbonating and drying zones.

Where the diameters vary down the kiln, d must be taken as the *average* diameter.

The following table is calculated from formula (2):

TABLE I—SHOWING CONNECTION BETWEEN DIAMETERS AND LENGTHS OF WET PROCESS ROTARY CEMENT KILNS

$$L = 25(d - 1.5) + 0.2(d - 1.5)^2$$

Diameter of shell, d' feet		Length L feet	Diameter of shell, d' feet	Length L feet
Ft.	In.	Ft.	Ft.	Ft.
3	0	38	10	227
4	0	64	11	255
5	0	90	12	284
6	0	117	13	314
6	6	130	14	344
7	0	144	15	374
7	6	157	16	405
8	0	171	17	435
8	6	185	18	467
9	0	199	19	499
9	6	213	20	531

For *DRY PROCESS CEMENT KILNS* the material is already dry before it reaches the kiln, and consequently the kiln is shorter by approximately the drying zone.

The following formula gives fairly reliable results for the connection between the length in feet of a dry process kiln and its diameter:

$$L = 20(d - 1.5) + 0.2(d - 1.5)^2$$

where L and d have the same meaning as before. The following is thereby compiled:

TABLE II—SHOWING CONNECTION BETWEEN LENGTHS AND DIAMETERS OF DRY PROCESS ROTARY CEMENT KILNS

$$L = 20(d - 1.5) + 0.2(d - 1.5)^2$$

Diam. of iron shell d feet		Length of kiln L feet		Diam. of iron shell d feet	Length of kiln L feet
Ft.	In.	Ft.	In.	Ft.	Ft.
3	0	30	6	10	185
4	0	51	0	11	208
5	0	72	0	12	232
6	0	94	0	13	257
6	6	106	0	14	281
7	0	117	0	15	307
7	6	129	0	16	332
8	0	139	0	17	358
8	6	150	0	18	385
9	0	161	0	19	412
9	6	173	0	20	439

(*To be continued*)

Editor's Foreword

THIS instalment is short but pithy; for it contains a formula for computing the dimensions of a rotary kiln based on thermodynamic considerations — in other words based on the thermic or heat work that the kiln is supposed to perform. Apparently about 260 to 265 ft. is the proper length for the usual American wet-process kiln 11 ft. 3 in. in diameter of the steel shell. For the dry process the kiln should be only about 50 ft. shorter — which would seem to prove most of our dry kilns too short.

X-Ray Study of Constitution of Portland Cement

THE x-ray diffraction method has been applied to a study of the constitution of portland cement clinker at the United States Bureau of Standards.

It has been found that $2CaO{\cdot}SiO_2$ and CaO combine to form $3CaO{\cdot}SiO_2$ and not a solid solution of $2CaO{\cdot}SiO_2 + CaO$; that $8CaO{\cdot}Al_2O_3{\cdot}2SiO_2$ does not exist in portland cement systems; that solid solutions are not formed between the aluminates and silicates of cement systems; and that free CaO is not present generally in commercial cement in amounts as great as 2.5%.

The limiting amounts were determined of each cement compound that could be identified by x-ray means as employed in this study. Twenty-eight commercial cement clinkers were subjected to x-ray examination, and $3CaO{\cdot}SiO_2$ and $62CaO{\cdot}SiO_2$ were identified in each. $3CaO{\cdot}Al_2O_3$, $4CaO{\cdot}Al_2O_3{\cdot}Fe_2O_3$ and MgO were found in the samples which contained these compounds, by calculation, in amounts great enough to permit of identification.

†Copyrighted by author, all rights reserved.

The new plant of the Inland Lime and Stone Co., Manistique, Mich., nearing completion

Rock Products Developments in Michigan and Wisconsin

Stone, Lime and Cement Industries Are Closing Active Season—Much New Production Is in Sight

By Earl C. Harsh
Associate Editor, Rock Products

THIS IS a narrative covering a swing around part of the Michigan and Wisconsin shore line, with brief descriptions of some of the rock products plants bordering on the Great Lakes in these states, and with notes of such changes and new operating methods as have been made recently. Cement, lime and crushed stone plants were visited.

At Detroit, crushed stone and lime are shipped in from other points, as well as a large part of the cement used in that district; some of the cement is brought down in bulk in self-unloading boats from the plants at Alpena, Petoskey and Port Huron to packing plants located on the river front and some in bags by barge from Bay City, while part of it is manufactured in the city by the Peerless Cement Corp.

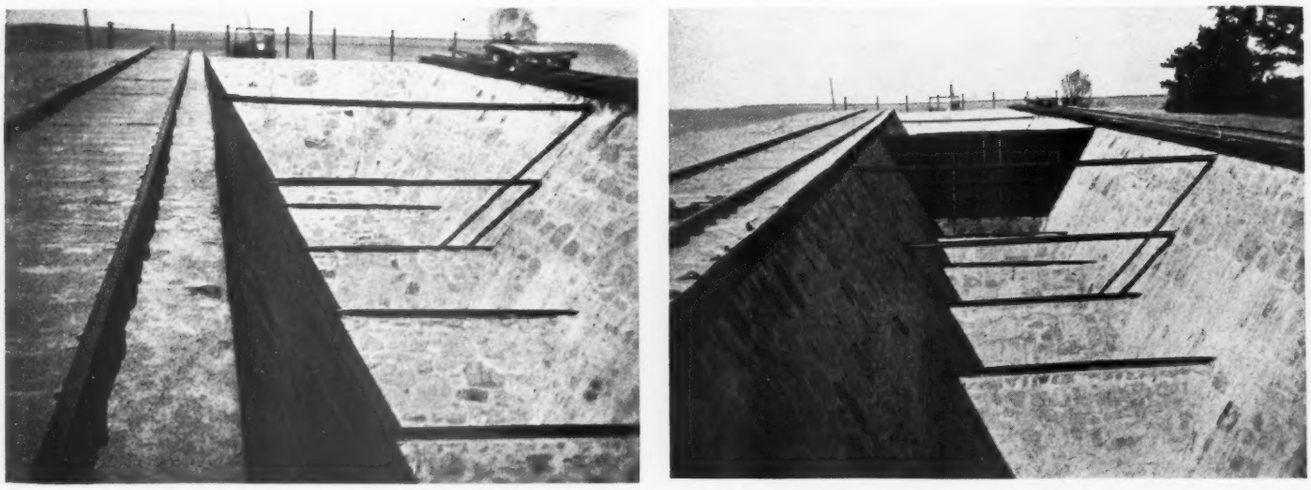
Wallace Stone Co., Bay Port, Adding Water-Shipment Facilities

The Wallace Stone Co. plant at Bay Port is one of the original crushed-stone operations of this district, having been started more than 40 years ago. It has a normal output of about 150,000 tons annually and is operated during 7 or 8 months of the year.

A 16-ft. ledge of limestone is worked, drilling being done with four tripod steam drills operated from a couple of portable boilers. A Model 76 Marion railroad type steam shovel loads to 6-yd. Western type, side-dump cars, which are hauled by steam locomotives in 7-car trains to the incline at the crushing plant. This plant is of a standard Allis-Chalmers design having a primary No. 12 gyratory crusher with a 4-ft. Symons cone crusher subsequently added for recrushing. All machinery is belt-driven from a 24-in. by 36-in. Allis-Chalmers Corliss engine. Steam is supplied by two Wickes boilers.

A new loading dock is just being completed, which will permit the shipment of stone by barge to Saginaw and Bay City. The stone from the crushing plant will be moved by rail to the storage dump at the shore end of the loading dock and from there carried out to the barge by belt conveyor.

The storage hoppers into which the stone is dumped are unusual and interesting in that they are of sloping masonry with a dirt fill backing. Extending under this storage is a belt conveyor tunnel with masonry sidewalls and concrete roof. A 36-in. inclined conveyor carries the stone out to a shuttle cross conveyor, from which it drops into the



The masonry hoppers at the Wallace Stone Co., Bay Port, view taken from the top of the storage fill

barge. A Merrick weightometer on the inclined conveyor weighs the stone as it goes to the barge. Both conveyors are Link-Belt, motor-driven through Link-Belt speed reducers.

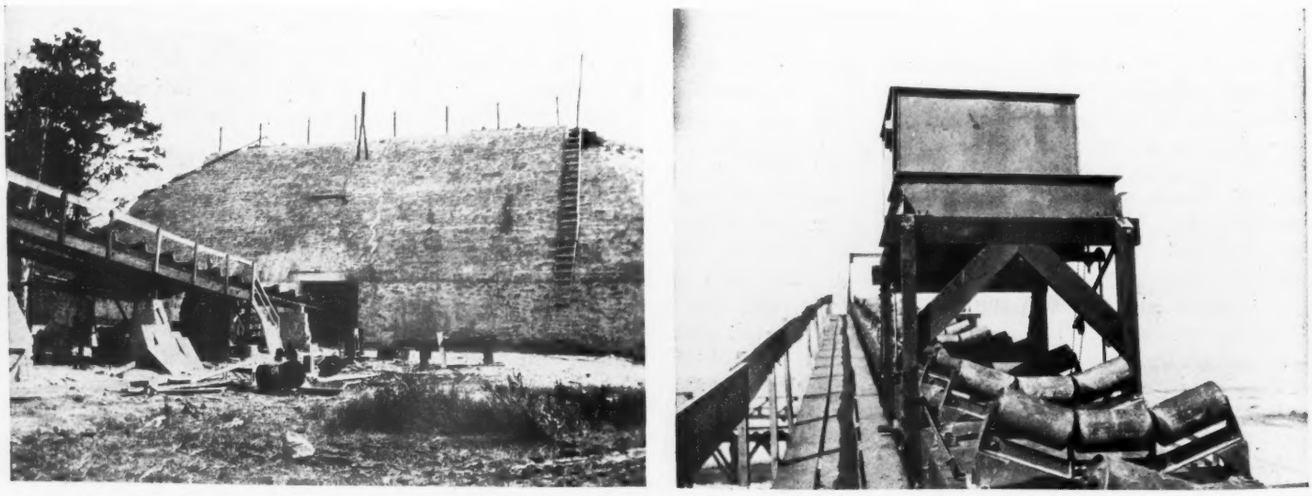
Michigan Alkali Co.: Huron Portland Cement Co., Alpena, Use Closed Circuit Grinding with Air Separation

At Alpena the Michigan Alkali Co. operates a quarry for the production of limestone, the coarse sizes being shipped by boat to the plant at Wyandotte, where the stone is burned into lime in vertical kilns and used in the manufacture of soda ash, while the smaller sizes are carried by belt conveyors from the crusher to the cement plant and utilized along with clay in the manufacture of portland cement.

The quarry, which is of considerable extent, has a total depth of about 125 ft. The stone is loaded by four railroad type steam shovels to single cars operated on the Woodford centrally controlled electric system. (This was one of the first installations of this system of quarry transportation.) At the crushing plant the stone is dumped to a Fairmount roll crusher and elevated to the top of the screen house in balanced skip hoists. Revolving screens are used for sizing and the plant has a normal output of 3000 to 4000 tons per day. The limestone for boat shipment is moved in railroad hopper cars on tracks extending over the loading bins on the dock and dropped either into a set of steel bins for direct spout loading, or into a set of reinforced-concrete bins arranged with conveyors below, which carry the stone to the boat. Under each bin is a short 36-in. Chain Belt steel apron conveyor discharging on to a shuttle belt conveyor which is movable across the hatch opening of the boat. Each conveyor has a capacity of 1000 tons per hour and the arrangement permits loading the average 7000-ton cargo in less than two hours. The shuttle loading equipment is now used entirely, except in the case of two boats arriving at about the same time, and has been found to have a number of advantages over the spout loading method, chiefly greater speed of loading, easier trimming and less breakage. This conveyor equipment and method of loading was described in Rock Products, December 22, 1928.

Loading dock with belt conveyor and shuttle loading conveyor just completed at Wallace Stone Co. plant, Bay Port, Mich.

The cement plant is a dry process operation with two sets of kilns and a total capacity of about 12,500 bbl. per day. The eight



At the Wallace Stone Co., Bay Port, Mich., plant. Belt conveyor and tunnel, with masonry retaining wall at end of the storage fill. At the right is an automatic weighing device on the belt conveyor to the loading dock

old kilns are 8 ft. by 110 ft. and the six new kilns 10 ft. by 150 ft. Waste-heat boilers on the new kilns provide power for the operation of the plant. The compeb mills on the raw grinding end have recently been equipped with air separators connected in closed circuit, which have increased their capacity about one-third, while at the same time increasing the fineness to 90% through 200-mesh.

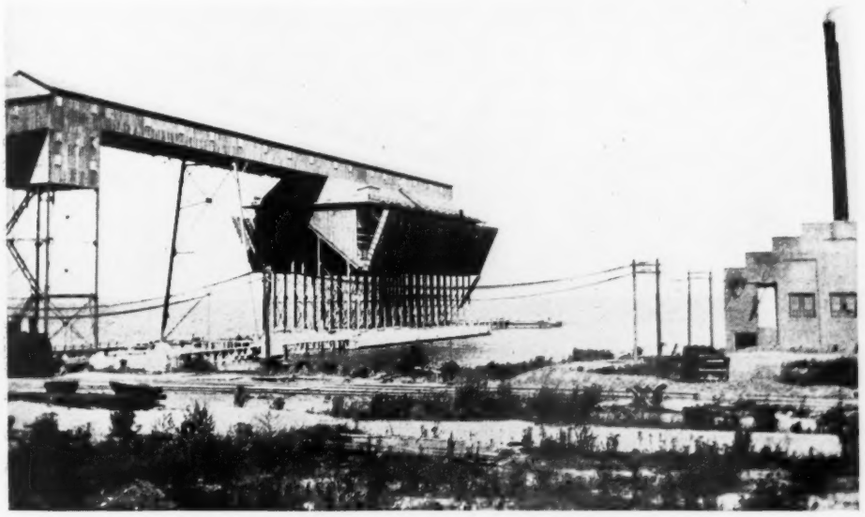
The plant has a quite complete installation of both Merrick and Richardson scales, the latter for accurately proportioning the raw mix, and the former for checking the amount of stone going to the plant and, in the case of the new kilns, the amount of clinker coming from each kiln. At each of the new kilns the clinker is cooled as it is carried out to the crane storage yard on slow moving pan conveyors instead of with the usual rotary coolers.

Concrete silos provide a storage of about 250,000 bbl., most of which is moved to a boat-loading plant for shipment in bulk to the company's packing plants at Buffalo, Cleveland, Toledo, Detroit, Milwaukee and Duluth, at each of which points storage of 40,000 to 175,000 bbl. is provided. The company has three self-unloading bulk-cement carrying boats (two in service at the present time) with carrying capacities of about 40,000 bbl., 35,000 bbl. and 13,000 bbl. respectively. These are arranged with hopper bottoms and a system of screw conveyors and bucket elevator for unloading.

The largest of these boats has recently been equipped with a Fuller-Kinyon pumping system in addition, so that either or both methods of unloading may be used. The new packing plant at Toledo, Ohio, completed last June, is arranged with pipes only, so that the silos are filled by the Fuller-Kinyon system, while at Duluth pipes have been added so that both methods may be used.

For boat loading, the cement is drawn from the main storage silos into a system of three parallel longitudinal screw conveyors under the silos, emptying into two cross screw conveyors which feed two 10-in. Fuller-Kinyon pumps. These pumps force the cement through 8-in. pipe lines into concrete bunkers alongside the dock, from the bottom of which it is fed to a system of seven screw conveyors feeding seven shuttle screw conveyors, the latter being arranged so that they can be run out over the hatches of the boat, and provided with a series of flexible discharge spouts leading down into the hatches. In this way the cement is loaded at the rate of 5000 to 6000 bbl. per hour.

Crushing and screening plant at Kelley Island Lime and Transport Co., Rockport

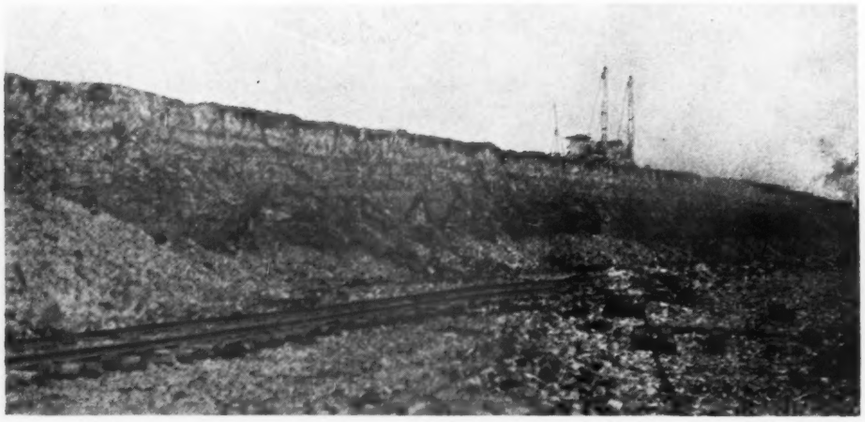


Dock and pockets for boat loading, Kelley Island Lime and Transport Co. Power house at right

Kelley Island Lime and Transport Co. Rockport Plant Uses Edison Rolls

Also in this district, at Rockport, about 15 miles northeast of Alpena, the Kelley Island Lime and Transport Co. operates a large crushing plant, shipping stone by boat

Rockport crushing and screening plant



View of one side of the Rockport quarry

for flux, cement and commercial uses.

Self-unloading boats with belt conveyors or scrapers in the hold under the cargo, and with a swinging boom belt conveyor which discharges the stone to the dock, are largely used. Flux stone is shipped to Duluth and to Lake Erie ports, stone for the manufacture of cement to Manitowoc and commercial stone to various points. The capacity of the plant is about 8000 tons per day, or normally about 2,000,000 tons per season of 7 to 8 months.

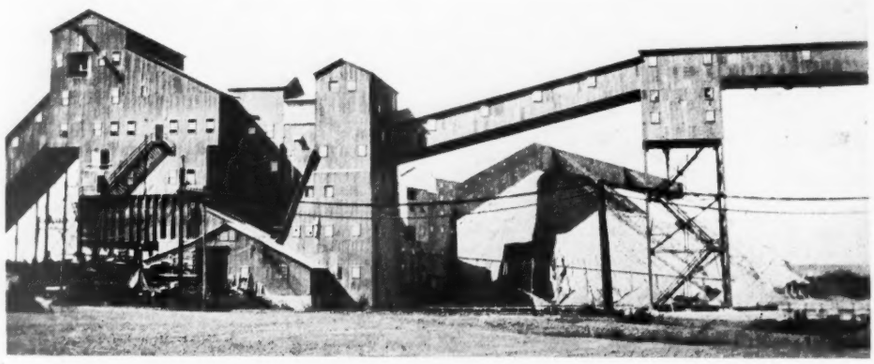
The deposit is a high calcium limestone of the Traverse formation. The quarry is of considerable extent, with the face more than a mile long. A 25- to 30-ft. ledge is being worked, with holes spaced about 12 ft. by 14 ft., loaded with du Pont 50% gelatin to give a ratio of about four tons of rock per pound of explosive.

Drilling is done with 10 Loomis well-drill rigs, five of the non-traction gasoline-engine-driven type and five of the traction type with electric motors. The quarry loading is done with Marion railroad type steam shovels, with 4-yd. buckets loading to 10-yd. Russell side-dump cars, which are moved to the crushing plant in nine-car trains on standard-gage tracks by Baldwin and American steam locomotives. Normally four Model 100 shovels are used on this work with eight locomotives.

At the crushing plant the cars are dumped to a set of Edison rolls, 6 ft. by 8 ft. in size (one of few surviving installations of this type primary breaker), from which the crushed stone is carried on two parallel 42-in. by 109-ft. belt conveyors to two parallel Link-Belt 60-in. pan conveyor type elevators, discharging to a surge bin supplying the screening plant.

From the surge bin stone is fed by four quadrant type swinging feeders to four 6-ft. by 24-ft. Allis-Chalmers, single-jacketed, revolving screens, which separate out the flux, or 2½-in. by 5½-in. size, a 1½-in. by 2½-in. size which goes to the recrusher, and a minus 1½-in. size.

The flux is carried out to storage on a 40-in. overhead belt conveyor, and the minus 1½-in. size is passed over four Robins Perfex single-deck screens with ⅝-in. mesh cloth, the oversize going to the recrusher, and the throughs on to a 30-in. overhead belt conveyor paralleling the other to the screenings storage beyond the flux. Both conveyors are contained in the same gallery supported on A-frames spanning over the storage pile at a height of 95 ft., this arrangement giving more than 40,000 tons of recoverable storage.



At Rockport operation. Screening plant with storage in background and belt conveyor to loading dock at right

New screen house at Michigan Limestone and Chemical Co., Rogers. Drive house for main belt conveyor in the foreground

Recrushing is done with a 7-ft. Symons cone crusher, this product being further screened over three Robins Gyrex double-deck screens, the minus ½-in. size going to the screenings storage and the ½-in. by 1½-in. size washed over a Robins Gyrex screen and conveyed to certain loading pockets on the dock by a 40-in. belt conveyor.

From the storage, either flux or screenings are drawn on to a 48-in. by 600-ft. belt conveyor in a tunnel under the pile, this conveyor discharging to a 48-in. by 140-ft. inclined conveyor, with arrangements for passing the flux over a gravity screen for cleaning before it goes to a second 40-in. belt conveyor carrying out over the loading pockets on the dock.

These dock conveyors are each equipped with Merrick weightometers and with trippers for discharging the stone into any pocket.

A 16-yd. electric shovel handling raw material in the quarry at Michigan Limestone and Chemical Co. operation, Rogers, Mich.

New 11-storied screen house recently completed for the Michigan Limestone and Chemical Co. at Rogers, Mich.

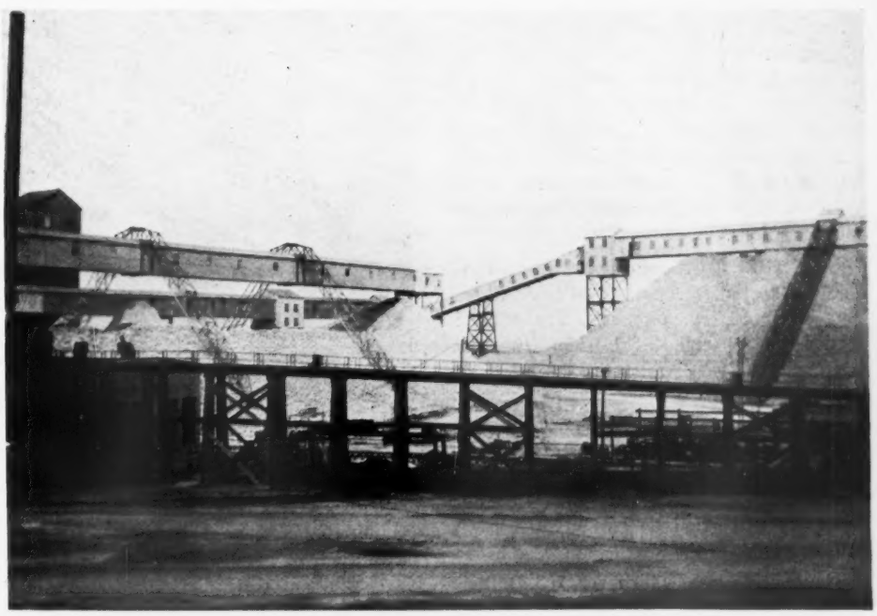
The 32 pockets, 16 on each side, have a capacity of about 350 tons each, boats being loaded by means of motor-operated spouts, which are raised or lowered for trimming the cargo.

Michigan Limestone and Chemical Co., Rogers—World's Largest Quarry

At Rogers, about 50 miles north of Alpena, is the largest single crushed stone operation in the world, with a production capacity of better than 10,000,000 tons per season of 7 to 8 months. This output is obtained by operating two 10-hour shifts, giving a production of 60,000 tons per day, or at the average rate of 3000 tons per hour. About one-third of this production goes out as fluxstone, the balance being shipped for chemical, cement and other uses. All shipments are by boat, about 1000 cargoes of an average of 10,000 tons each per season.

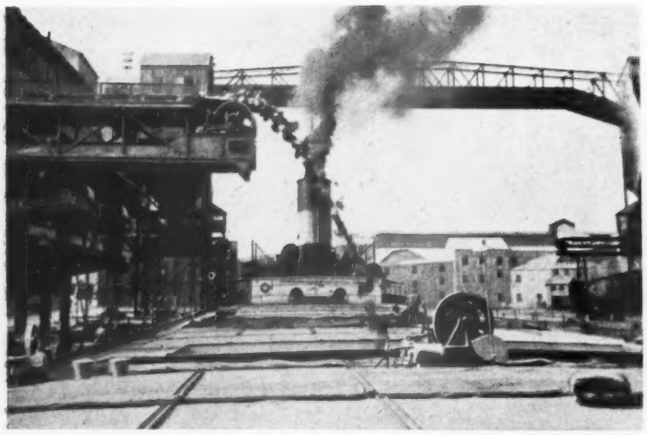
The deposit is a high-calcium limestone of the Dundee formation, some of which runs less than 1% magnesia and 0.6% silica.

A large acreage has already been quarried out, part of it to only one-half the depth of the deposit. The quarry face is five miles long and from 50 to 125 ft. high. Electric shovels are used for most of the quarry loading, along with two or three steam shovels. The latest to be installed is a 750-B, Bucyrus electric shovel with a 16-yd. dipper and arranged with a special sliding counterweight connected through cables with the hoisting drum so that it assists in the



Part of the storage piles at Michigan Limestone and Chemical Co., Rogers, Mich.

The primary crusher house and the original shovel mounted for historic reasons at the Rogers plant of the Michigan Limestone and Chemical Co.



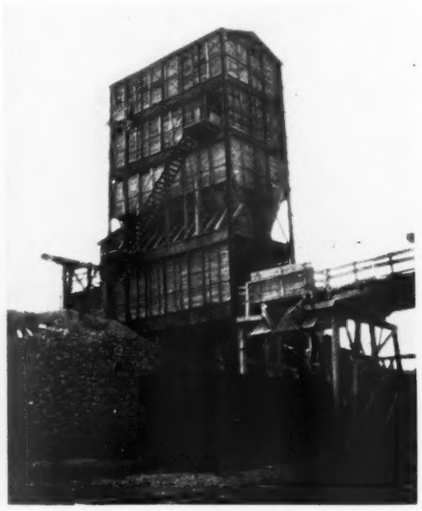
Two views of the boat-loading methods with shuttle belt conveyors at docks of the Michigan Limestone and Chemical Co., Rogers, Mich.

digging operation in somewhat the same way that a flywheel serves on rotating machinery. This shovel is driven by an 800-kw. motor generator set, and is at present being used to open up a new cut on the lower level below the old quarry floor. Working on a 40-ft. face and loading to cars on top it makes a cut some 130 ft. wide.

Drilling at this point is done by a battery of Cyclone blast-hole drilling machines putting down holes about 22 ft. by 24 ft. apart, which are loaded with du Pont gelatin to give a ratio of about 6 tons of rock per pound of explosive. A Loxite plant located near the quarry provides Loxite, liquid oxygen explosive, for about one-fourth of the total explosive requirements of the quarrying operations.

Besides the above-mentioned large shovel, five other electric shovels are used, all but one having 12-yd. dippers. The rock is loaded to 30- and 40-yd. side-dump, air-operated steel cars, which are hauled to the primary crusher in 15-car trains by large standard-gage steam locomotives. Here they are dumped to one of two 60-in. Traylor gyratory crushers, the other being kept ready in reserve. From the primary crusher the stone is carried on two parallel 54-in. belt conveyors to the top of the screen house.

These conveyors, which are 700 ft. long center-to-center, are interesting as having the heaviest and thickest belts so far used in any industry. The belt is 16-ply at the sides and 14-ply at the center, of 42 oz. duck, and with 13/32-in. rubber cover on top, measuring about 1½-in. thick. Each belt, weighing some 60,000 lb., was shipped in three pieces and spliced and vulcanized on the job to make it endless. One belt was furnished by Robins and one by U. S. Rubber. Special 54-in. Timken, roller-bearing idlers are used. Each conveyor is driven near the center by a 250-hp. motor through a special tandem drive, this equipment being located in a separate building between the primary crusher house and the screen house.



Screen house at Campbell Lime Co. plant

The new screen house, put into operation last spring, gives the impression of an office or factory building rather than part of a stone-crushing plant. It is an 11-story building of heavy steel-frame construction, with brick walls and steel sash, served by two large freight elevators. The floors are of steel and concrete, and heavy steel plate hoppers and spouts are used under the various screens. The flow of the material is by gravity down through the building, from one set of rolls and screens to another. Each main conveyor from the primary crusher discharges to a large roll grizzly at the top, the oversize going to Traylor roll crushers, and the throughs to roll grizzlies below, followed by another set of two roll grizzlies below that. At this point the flow of stone is divided to 12 vibrating screens, and from these continues on down over three more sets of vibrating screens, 48 units in all on the four levels. Open hearth, flux and commercial sizes are taken off on belts at the different floors and carried out to the various storage piles. The screen openings are progressively smaller at each level from top to bottom. Washing with spray jets is begun on the third set of roll grizzlies and continued on all the vibrating screens. The six roll grizzlies and the 24 vibrating screens handling the coarser commercial sizes were

Two quarry views at the Campbell Lime Co., Indian River operation, the one at the left taken from the screen house. The right view shows also type of drill and steam shovel used

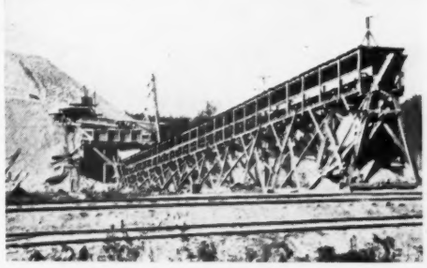
General view of the rotary kiln lime burning plant of the Campbell Lime Co., Indian River, Mich., and, at right, screen house with lime plant opposite

furnished by Huron Industries, Inc., Alpena, while the smaller sizes are handled on two-unit Hum-mer screens. A 7-ft. Symons cone crusher is being installed for recrushing.

Four separate storage piles are used, flux and open hearth on the south side of the loading slip, and two storages for the Nos. 1, 2, 3 and 4 commercial sizes on the other side. The open-hearth pile (5-in. by 10-in. size) has a recoverable storage capacity of about 45,000 tons, while the flux (2½-in. by 5-in. size) and the two commercial piles have a recoverable storage capacity of about 60,000 tons each. Each pile is made by a belt conveyor and tripper in a gallery supported on steel A-frames spanning over the pile.

From these storages the stone is reclaimed by belt conveyors in tunnels under the piles, one tunnel under the open hearth and each commercial pile, and three tunnels under the flux. These conveyors in turn feed shuttle conveyors which discharge into the boat, three flux loading conveyors and one open hearth conveyor on one side of the slip, and one for the commercial stone on the other side. The loading rate of one belt is 2000 tons per hour, so that a 10,000-ton boat is loaded in about five hours, or in much less time when it is carrying flux stone.

Toward the shore end of the loading slip are coal loading shuttle belt conveyors on each side so that boats may be refueled during the loading operation. The new power house put into operation last September is now supplying power for the whole operation, with 10,000-kw. capacity installed at present. This equipment is of the most modern type using a high degree of superheat.



Campbell Lime Co., Indian River, Mich., showing scraper installation with gyratory crusher, washing screens and belt conveyor for reclaiming from storage dump

Campbell Lime Co., Indian River, Has Rotary Kiln Lime Plant

At Afton, about 25 miles east of Petoskey, the Campbell Lime Co. produces crushed stone and lime, which is burned in a rotary kiln with powdered coal as fuel. The deposit is a high-calcium limestone of the Traverse formation, the stone being shipped to beet sugar factories and to the Chelsea state cement plant, as well as for commercial purposes, while the lime is practically all shipped in bulk for water softening, paper making and chemical purposes.

A 40-ft. quarry face is worked, using a 3-yd. 95-C Bucyrus railroad type steam shovel along with Vulcan, Davenport and Porter steam locomotives and 6-yd. Western type, side-dump cars. The stone is put through a No. 12 Allis-Chalmers gyratory crusher and over a 5-ft. by 16-ft. revolving screen with 5-in. perforations. The plus 5-in. size is spouted direct to railroad cars and shipped to sugar factories, while the minus 5-in. material is elevated and further sized over two 4-ft. by 8-ft. Robins vibrating screens and spouted to railroad cars or moved in small side-dump cars to the lime plant or to storage.

The capacity of the crushing plant is 1500

At Campbell Lime Co. plant. Left, rotary kiln lime burning plant; right, loading bins at the lime plant

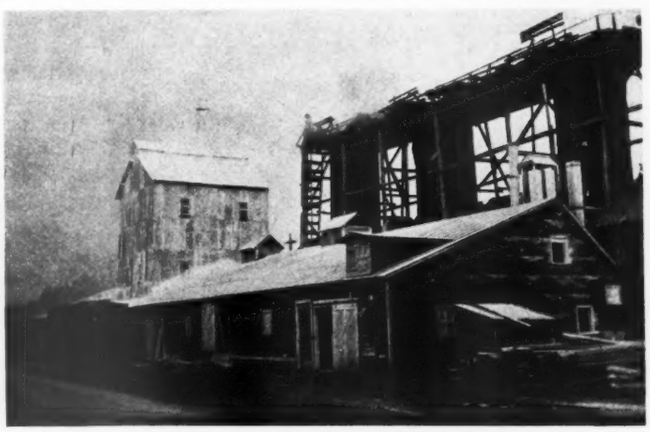
Campbell Lime Co. storage dump, showing conveyor gallery from storage

Character of the stone quarried at the Campbell Lime Co. plant

tons per day, about half of which is "sugar" stone. One part of the storage is arranged with a tunnel and belt conveyor for returning stone to the lime plant during the winter or when the stone plant is not operating. Part of the stone going to the Chelsea cement plant is reclaimed from the storage dump by a Sauerman scraper installation, feeding a 4-ft. revolving screen in which it is washed and then put through a No. 7½ Allis-Chalmers gyratory crusher and carried on an inclined belt conveyor to railroad cars for shipment.

The stone going to the lime plant is put through a second smaller crushing plant consisting of a No. 6 and No. 5 Gates crusher, 30-in. chain bucket elevator, and 4-ft. by 8-ft. Robins "Roco" screen, where it is reduced to 1½-in. size and the fines removed. Only the ⅜-in. by 1½-in. size is burned in the rotary kiln.

The lime burning plant contains a 6-ft. by 100-ft. kiln which was installed in 1916, and an 8-ft. by 100-ft. kiln installed in 1928, only the latter being used at the present time. It is driven by a variable speed motor with controller at the firing end, and is equipped with a Jones and Hartman coal dryer attached near the center. (The first such installation in the lime or cement industry, we believe.)

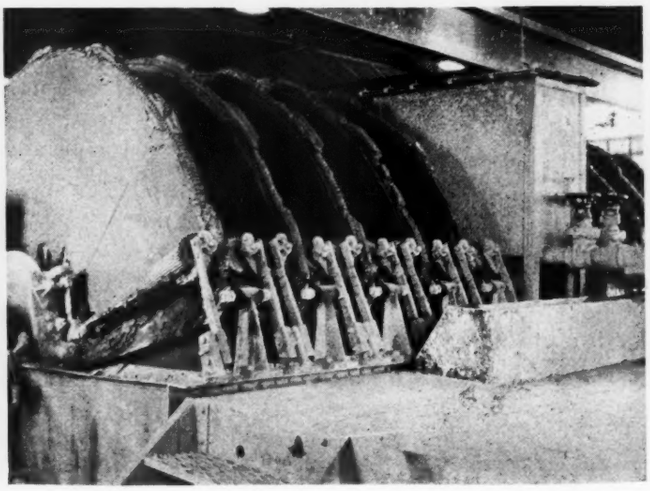


Wood-burning kilns and hydrating plant of the Northern Lime and Stone Co., Petoskey, Mich.

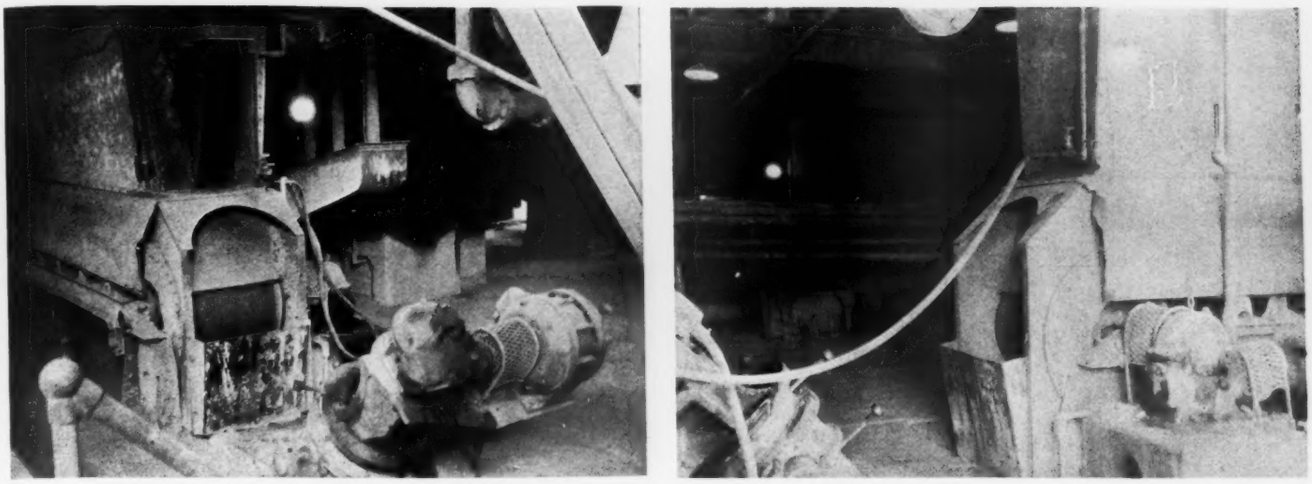
Coal is received in a track hopper and conveyed and elevated to a concrete storage bin from which it is drawn to a Jeffrey hammer mill in the basement, and then elevated and conveyed on a short 16-in. belt conveyor, having a Cutler-Hammer magnetic head pulley, to a second and smaller bin. From this bin it is fed by a Bonnot swing feeder to an inclined 10-in. wooden flight drag conveyor carrying to the Jones dryer, and from the dryer is carried back on a second inclined drag conveyor to a bin over the pulverizer, located in front of the kiln hood. A Bailey spiral type meter with counter has been installed in the spout feeding the pulverizer.

The coal is pulverized in an "Attrita" pulverizer, driven by a direct-connected 40-hp. Howell slip-ring motor, this machine having a fan in tandem with the pulverizing section, which blows the powdered coal into the kiln. Additional air, which is added to the coal mixture in the burner pipe, is furnished by a Clarage fan.

The kiln has a production of 75 tons of lime per day, with a coal consumption of 25 to 30 tons, or 27½ tons average, giving a fuel ratio of about 2¾ to 1, or 36%. "Arcofrax" brick is used in the hot zone and



Slurry filters at Petoskey cement plant



Two views of the belt conveyor and screw feeder between filter and kiln at the Petoskey plant

Harbison-Walker "Special" beyond. The kiln is operated intermittently, and any ash rings resulting from the direct coal firing are removed during such shutdown periods. Temperature and draft readings have been made and gas sampling has been done to determine the best operating conditions. Practically all of this lime is shipped out as pebble or lump lime in bulk, although some is pulverized and shipped in bags.

Northern Lime and Stone Co., Petoskey, Still Makes Wood-Burned Lime

The Northern Lime and Stone Co. has one of the few plants left in Michigan which is burning lime with wood as fuel. It has three shaft kilns and a hydrating plant, most of the output being hydrated. The kiln output is about 100 bbl. or 10 tons each per day. The hydrating plant consists of a Sturtevant open-door crusher, Clyde hydrator and Raymond air separation system, with Bates valve bag packer. Most of the operation is carried out on a piece rate basis, only the quarry haulage and the hydrating being done by day labor. Kiln stone is broken and loaded at 50 c. per car of about 2½ tons, and burning and drawing at 5 c. per bbl. or 50 c. per ton. The bagging and loading is done in the same way at 12 c. per ton. About 6½ cords of wood, costing $3 per cord, is used per 100 bbl. or 10 tons of lime. This would seem to be a very efficient and economical small operation.

Petoskey Portland Cement Co., Petoskey, Has Made Many Improvements

This plant, the first wet-process plant designed originally to operate entirely from power generated by waste-heat boilers, was completed and put into operation in 1921, and was described in Rock Products, January 14, 1922. It was a straight-line design, including two 10-ft. by 150-ft. kilns and two 7-ft. by 22-ft. compeb mills on both raw and finish ends. Later in 1925 the capacity of the plant was doubled, bringing it up to four kilns with a nominal daily capacity of 4000 bbl. Since that time a number of changes and additions have been made, particularly the installation of slurry filters last year, and improvements in grinding methods in both the raw and finished departments this year. The power plant now includes two 1000-kw. and one 2000-kw., Allis-Chalmers turbo generators. The storage silo capacity has been increased to 350,000 bbl.

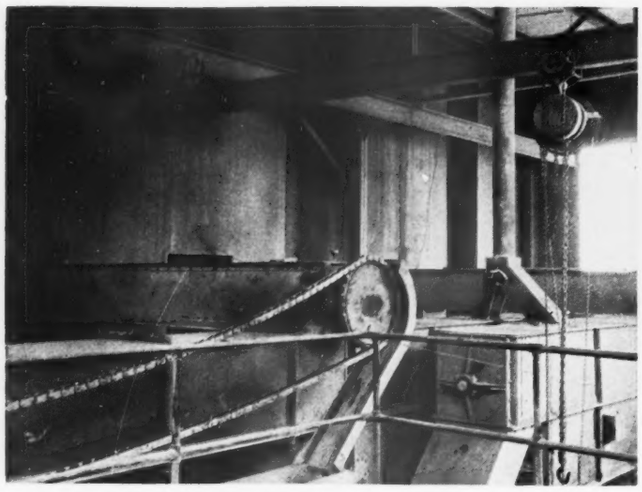
Filtering of the slurry going to the kilns was begun in July, 1929, with the installation of Oliver continuous type disc filters. Two 5-disc units in tandem (10 discs) are used on each of the four kilns. These discs are 12 ft. in diameter, each being made up of 15 sectors, or individual bags, with a filter cloth area of 200 sq. ft. per disc or 2000 sq. ft. for each kiln. Four men look after all eight filters, normally changing 45 bags per day, which are cleaned and inspected and repaired as necessary. After being tacked on the sector frames and before being used again, the bags are treated with linseed oil at the edges, this being sprayed on with a small air atomizer to cut down the rotting of the cloth at these points. The life of the bags is about four months.

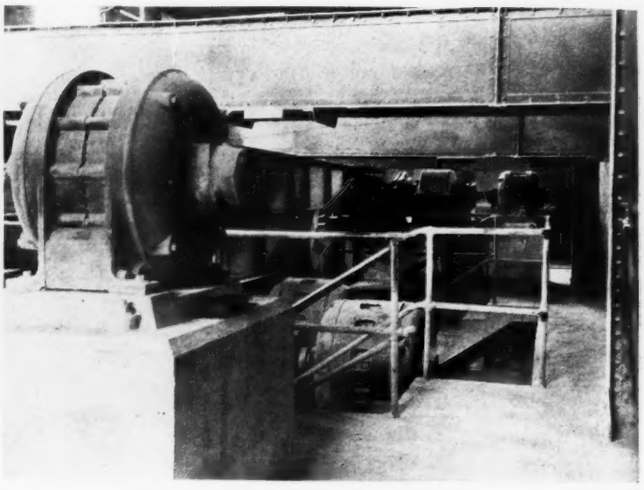
To maintain the vacuum for the filters three Ingersoll-Rand vacuum pumps have been installed, one steam driven and the other two driven by 100-hp. Allis-Chalmers synchronous motors. Two of these pumps (one being kept in reserve) hold a 22-in. to 25-in. vacuum on all the filters. Each filter unit is driven by a 3-hp. Allis-Chalmers, direct-current, variable-speed motor through a double worm and gear reducer. The filter cake from each double unit at each kiln drops on to a 30-in. by 22-ft. Link-Belt conveyor driven by a 5-hp., Allis-Chalmers induction motor through a Cleveland worm gear reducer, and falls from this conveyor into an inclined screw feeder leading into the kiln. The screw feeder is driven at 95 r.p.m. by a 10-hp., 690-r.p.m., Allis-Chalmers induction motor through a De Laval 7¼ to 1 ratio speed reducer. The slurry going to the filters contains 35% moisture, and the cake coming from them 18%, this cake being about ⅜-in. thick.

Vibrating screens used in closed circuit with preliminary clinker grinding mills at Petoskey cement plant

Filtering the slurry in this way before it is fed into the kiln and thus removing approximately one-half of the water which would otherwise have to be evaporated in the kiln has reduced the coal consumption more than 15%, from 125 lb. down to 105 lb. per bbl. of cement, and has also increased the kiln capacity more than 20%, from 1100 bbl. up to 1400 bbl. per kiln per day.

Another change has been the addition of Minogue dust feeders to two kilns for returning to them the flue dust from the waste-heat boilers. This type of feeder was developed and first installed at Manitowoc



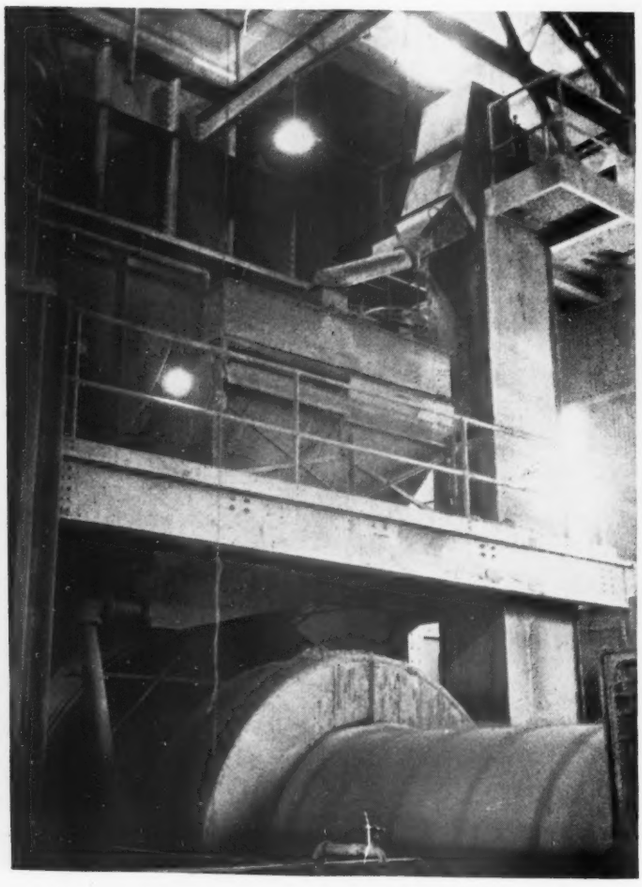


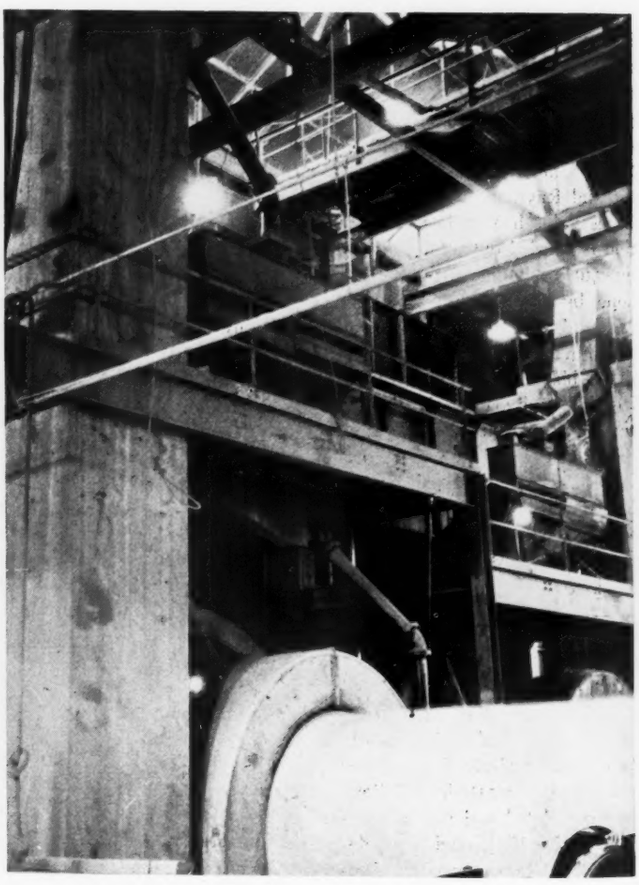
At Petoskey cement plant. Screw conveyors feeding pneumatic pumps and the driving motors

and will be described in connection with that plant.

A change made in the raw grinding end is of interest, as it is one of the first installations of this kind using "Hum-mer" vibrating screens in closed circuit with the first compartment of the wet grinding compeb mills. The first installation was made last May on one mill, and a second mill has since been equipped. This change was made by putting a partition across the sump under the end of the first compartment of the 7-ft. by 22-ft. mills to keep the coarse and fine slurry separate, and removing the outer screen and part of its supporting frame, so that the material coming from the first compartment of the mill would flow into the first compartment of the sump, and the scoops at the feed end of the second compartment of the mill would dip out of the second compartment of the sump. In this way the material from the first compartment of the mill flows into the first sump and to a bucket elevator which carries it up to a double-unit, single-deck Hum-mer vibrating screen 8 ft. wide by 5 ft. long, with 16-mesh cloth, where the oversize is spouted to the feed end of the mill and the fines flow to the second sump and are scooped into the second compartment of the mill. A 16-in. Link-Belt, "perfect discharge," double-strand, chain bucket elevator driven by a 7½-hp. Allis-Chalmers motor through a De Laval reducer is used for elevating the slurry to the screw. This change has increased the capacity of the mills about 35%, from 56 bbl. per hour each to 76 bbl. per hour, making a product 90% minus 200-mesh.

On the clinker grinding end a change has





Showing vibrating screens at Petoskey Portland Cement Co. being used in closed circuit with compeb mills on raw grinding

also been made from the original installation, one of the 7-ft. by 22-ft. compeb mills having been replaced by two Bradley "Hercules" mills and the other three compeb mills converted to tube mills, and an installation of Hum-mer vibrating screens in closed circuit with the Bradley mills has just been completed.

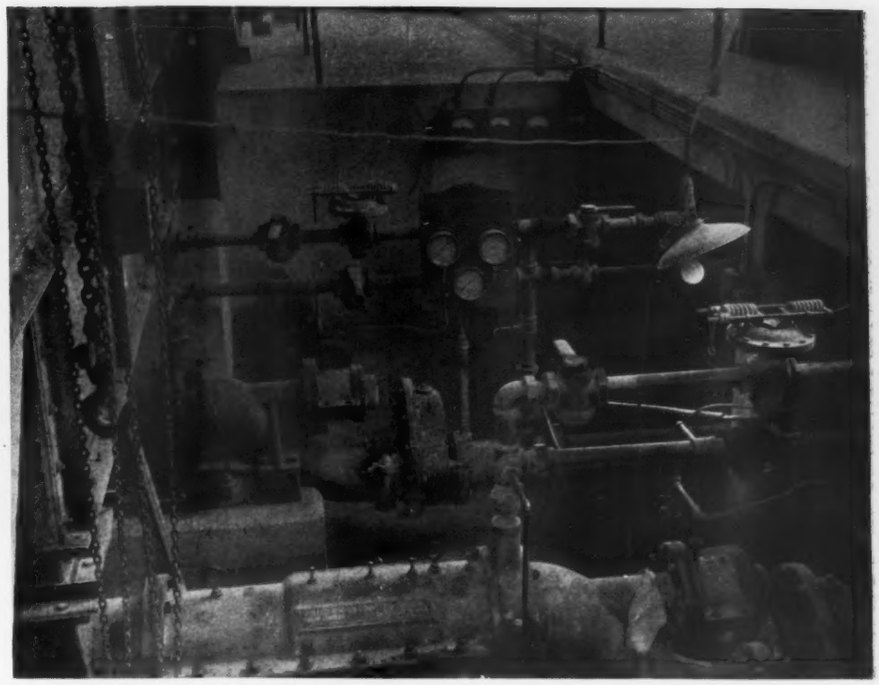
With this new installation the clinker coming from the Bradley mills is elevated in a 20-in., Link-Belt, bucket elevator to 16-in. screw conveyors which feed it to four single-deck double-unit Hum-mer vibrating screens, each 8 ft. wide by 5 ft. long, with 24-mesh cloth. Here the oversize is collected in 14-in., Link-Belt screw conveyors and returned to the Bradley mills, while the fines are carried by screw conveyor to the feed bins over the three tube mills.

Of interest in passing is the automatic control of the feed to the Bradley mills. By means of a relay in the Bradley mill motor circuit, connected with the small motor driving the feed table, the feed is stopped when the load on the mill reaches a certain maximum point, and is again started when it has dropped to a predetermined point.

This closed-circuit preliminary grinding and screening system has not been in operation long enough to show results, but is expected to increase the capacity of the mills at least 25%, and at the same time to give a fineness on the finished cement of 90% through 200-mesh instead of the previous 85% through 200-mesh.

A further change is in the method of handling cement for boat shipments to the packing plants at Detroit, Milwaukee and Chicago. About one-third of the cement produced, or roughly 500,000 bbl. per year, is shipped by boat. Formerly these boat shipments were in bags, loaded by a system of belt conveyors, but in April, 1929, the Fuller-Kinyon pumping system both at the plant and aboard the boat was put into operation for loading and unloading.

The shore installation at the plant consists of two 10-in. Fuller-Kinyon pumps fed by two 24-in. cross screw conveyors from four 18-in. longitudinal screw conveyors under the main storage silos. Each of the two conveyor units is driven by a 60-hp. induction motor through a gear reducer and steel roller chain. The 10-in. pumps are each direct-connected to 300-hp. induction motors.



Pneumatic pumps used in loading bulk cement to boat at Petoskey Portland Cement Co. plant, Petoskey, Mich.

The screw conveyors in this installation were furnished by the Link-Belt Co., the reducers and couplings by Huron Industries, Inc., and the roller chain by Link-Belt and Chain Belt.

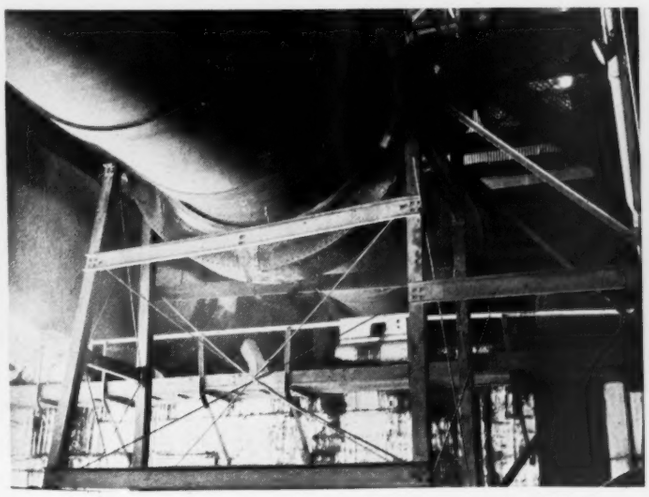
The motors, which are arranged with automatic starters for push-button control, were furnished by the Allis-Chalmers Manufacturing Co.

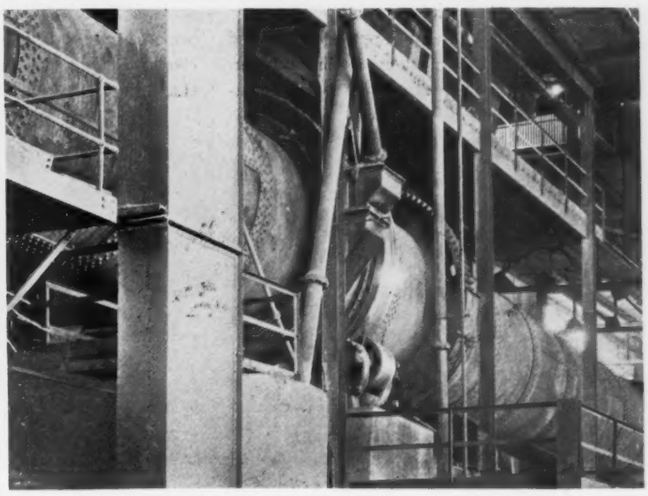
Air for the Fuller-Kinyon pumps as well as for other purposes around the plant is furnished by a 2000-c.f.m. steam-driven air compressor, a 1000-c.f.m. compressor driven by a 175-hp. motor, and two smaller compressors driven by 50-hp. motors, which are all Ingersoll-Rand with Allis-Chalmers motors. The cement is conveyed in two 8-in. pipe lines a distance of about 800 ft. from the pumps to the boat at the rate of 1400 bbl. per hour from the two pumps.

The steamer *J. B. John,* which is used in this service, carries 13,000 bbl. of bulk cement and can be loaded in about 11 hours, including the time required for setting up and for cleaning the lines.

Inland Lime and Stone Co., Manistique—New Plant Nearing Completion

The new plant of the Inland Lime and Stone Co. is well along toward completion, as indicated by the accompanying photo-





Flue dust feeder for returning dust to kiln as used at the Petoskey cement plant

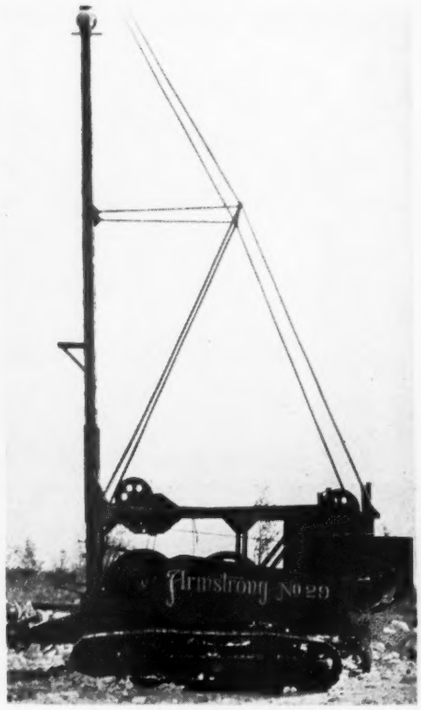
Cement storage silos, showing pump and screw conveyor house in foreground, Petoskey cement plant. At the right is a view of the additional housing for the vibrating screens on the finish grinding end

Concrete tunnels under the storage kilns at Inland Lime and Stone plant, Manistique

graphs, and officials expected to be able to start crushing stone about November 1.

It will be the second largest commercial crushing plant in the country, being designed for a capacity of 5,000,000 tons annually, and it is expected to ship 2,000,000 tons the coming season. The plant is located 22 miles northeast of Manistique on the shore of Lake Michigan where a large storage and loading dock, with protecting breakwater, have been built. The quarry is 7 miles inland, connected with the plant by a standard gage electric railway.

Everything about the operation has had to be constructed new from the ground up on the sand dunes in a more or less inaccessible spot, so that a tremendous amount of work has been done since the project was started in May, 1929. The features which impress one on a first visit are the large storage, with its traveling belt conveyor stackers and belt conveying system; the



Blast-hole drilling machine at Inland Lime and Stone operation

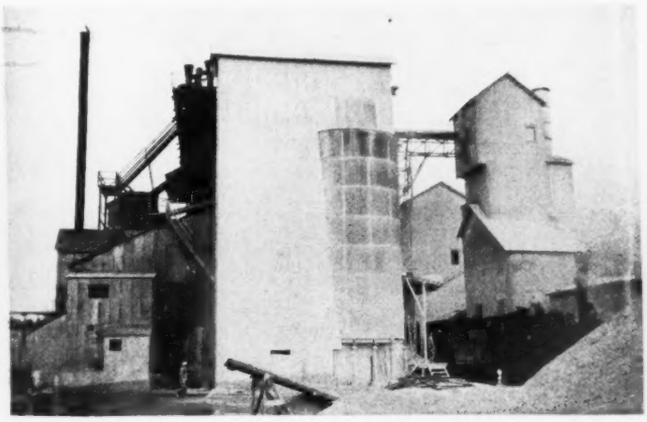
Views from the Inland Manistique plant showing typical drilling machines and one of the 5-yd. shovels being used temporarily on stripping

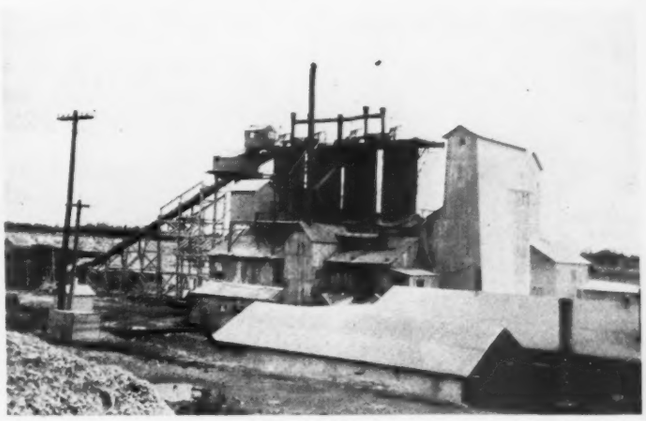
Tractor and trailer caught working on highway construction near plant of Inland Lime and Stone Co., Manistique

One of the 30-yd. side-dump quarry cars with motors in use at plant of the Inland Lime and Stone Co.

method of transporting the rock from the quarry to the crushing plant; the quarry property itself; and the complete and most modern electrical equipment used in all branches of the operation. The deposit is a very white high-calcium limestone with very little overburden, lying level and 290 ft. above the lake.

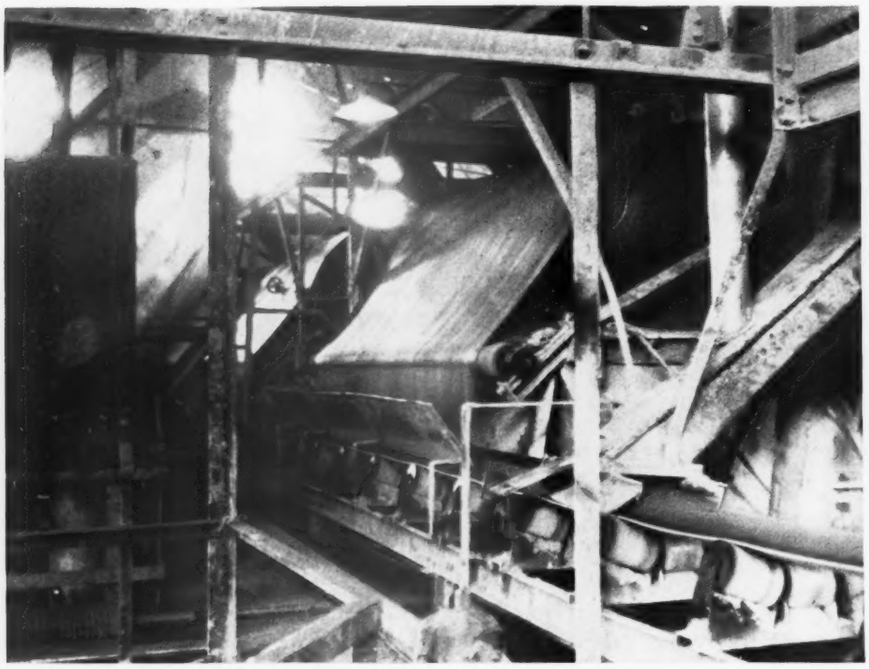
The manner of moving the rock from the quarry to the crusher is, so far as we know, new in the stone industry. This will be done by trains of one 50-ton capacity, side-dump "Differential" electric motored steel car hauling seven 50-ton Koppel cars, power coming through an overhead trolley from two substations, one at each end of the line. These substations each contain two 600-hp. General Electric motor generator sets, delivering direct current at 600 volts, and the one at the quarry may be started and stopped by remote control from the station at the crushing plant. The quarry cars will be dumped by an air-operated rig to a 60-in. Allis-Chalmers gyratory crusher, from which the stone will be conveyed to roll grizzlies for scalping. Recrushing will be done in a 20-in. gyratory crusher and a Symons cone crusher. Sizing from that point on will be done on Stephens-Adamson vibrating screens. The operation is divided among several buildings of moderate size rather than one large building. Two single and one double stacker will carry the sized stone to four separate storage piles, and from these it will be reclaimed on 60-in. belts in tunnels below the piles and carried out to a shuttle





The four-kiln lime burning and hydrating plant of the Inland Lime and Stone Co., which is located at Calspar, Mich.

At the Inland Lime and Stone Co. operation, Manistique. Left, one of the substations used in the quarry transportation system. Right, the 60-in. belt conveyor from the storage to shuttle loading conveyor



Fish-line cords are used in slurry filter operations at Manitowoc Portland Cement Co.

loading conveyor at the rate of 3000 tons per hour. The conveying machinery, screens and roll grizzlies were all furnished by the Stephens-Adamson Manufacturing Co., and the details of the plant were largely designed by this company in conjunction with William Sykes, chief engineer of the Inland company.

A complete description of the plant will be published in a forthcoming issue of Rock Products.

Manitowoc Portland Cement Co., Manitowoc, Wis., Has Made Numerous Improvements

Several changes in operating methods and equipment were noted at the plant of the Manitowoc Portland Cement Co. This is a wet-process, waste-heat-boiler plant with three 10-ft. by 160-ft. kilns, which was described in Rock Products, September 6, 1924. Limestone is brought in self-unloading boats from Rockport, Mich., and the clay used is pumped from a pit about a mile from the plant.

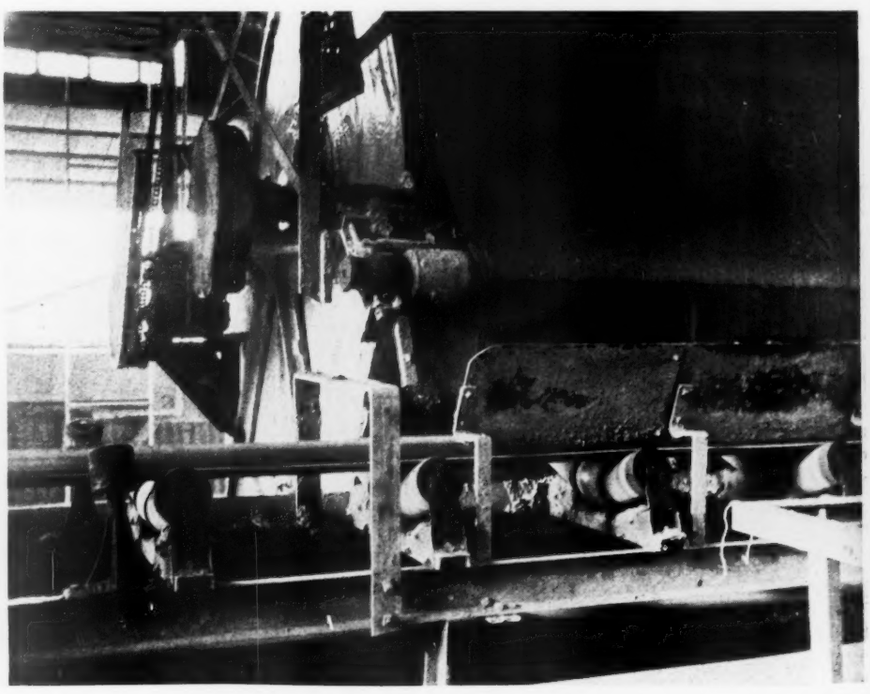
In the way of changes, slurry filters of the drum type were installed in 1928. These are quite interesting and are understood to be the only installation of this particular kind on cement slurry in the United States.

On the dry grinding end, one of the original 7-ft. by 22-ft. compeb mills has been replaced by two Bradley Hercules mills, and the other two compeb mills converted to tube mills, so that the coarse clinker grinding is now done in the two Bradley mills and the fine grinding in two 7-ft. by 22-ft. tube mills. These Bradley mills have been equipped with automatic feed control, as at Petoskey.

Minogue flue dust feeders have been added to two kilns, and Minogue agitators to the slurry tanks, while the three 8-ft. by 60-ft. rotary coolers have been improved according to a scheme developed by H. Vanderwerp, vice-president of the company, whereby they are lined near the feed end with a series of cored liners connected with a blower in such a way that air is blown through the hot clinker. This arrangement gives greater capacity and more rapid cooling of the clinker, saves the shell from extreme heat, and also, it is said, gives an easier grinding clinker as a result of the rapid cooling by air.

The Minogue feeders and agitators were developed and patented by R. E. Minogue, assistant superintendent of the company, and are manufactured by the Manitowoc Engineering Works. The feeder is a means of returning to the kilns the flue dust from the waste-heat boilers, and consists of a curved feed pipe attached to the kiln shell and extending through it, and covered by a dust-tight housing. The dust to be returned is conveyed by a small screw conveyor to the housing, and by means of a valve arrangement in the feed pipe a certain amount of dust is fed back into the kiln at each revolution. This is released into the kiln underneath the load so that there is a minimum of dusting. The feeder is installed at a point near the feed end where the material in the kiln is already thoroughly dried. Dust is fed into only one kiln at a time alternately in this way at a rate of about 18 tons per day. The feeder has a capacity up to 70 lb. per revolution.

The Minogue agitators used on the slurry tanks have an automatic distributing valve and a governor or control valve, so that air is admitted in proper sequence to the different sections of the revolving pipes at the bottom of the tank, and so that it is also turned on and off at adjustable intervals for intermittent air agitation. The two agitator arms and pipes are revolved at a speed of 1 r.p.m. and the air is normally on for five revolutions and off for 30 revolutions. A by-pass valve around the control valve also permits using the agitator as a slurry mixer with the air on continuously, if desired. With this intermittent system of air agitation it is claimed that a uniform mix-

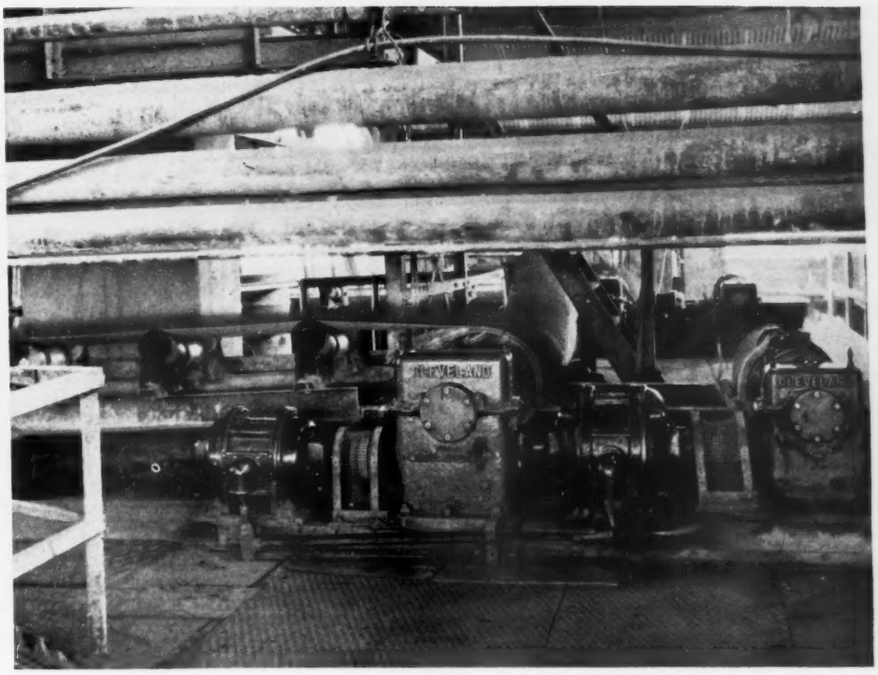


Another view of the slurry filters at Manitowoc

ture is maintained with less power and much less air.

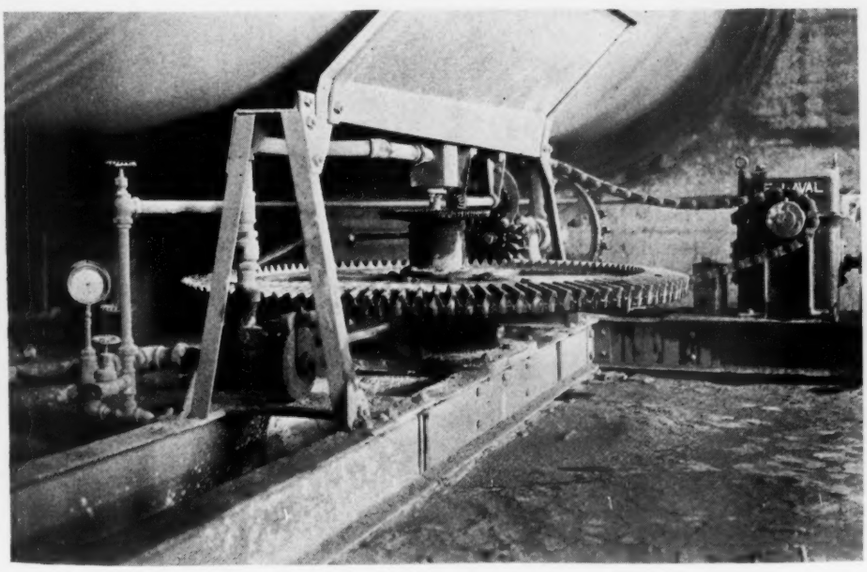
The slurry filters used here are of the continuous, drum type known as "Feinc," made by Filtration Engineers, Inc. Because of the unusually viscous nature of the limestone-clay slurry used, it was felt that this type would be more satisfactory than the disc type. Nine units are used, arranged in three rows, three in each row, so that the filter cake from each set of three falls on a belt conveyor carrying over to the feed screw discharging into the kiln. The drum of each unit is 12 ft. long by 8½ ft. in diameter, with the filter cloth covering it in one piece, and giving a filter cloth area of about 320 sq. ft. per unit, or 960 sq. ft. per kiln. For the purpose of exhausting the air within the drum and thus drawing the moisture through the filter cloth, the drum is divided into 24 longitudinal sectors, each about 13 in. wide at the circumference, these sectors being automatically connected in proper sequence with the vacuum and drainage line by valves as the drum revolves.

The lower part of the drum revolves in a slurry tank and picks up a certain thickness of the slurry, which is carried up over the top and dried by suction. At about the three-quarters point, as it descends, the vacuum is cut off and the dried cake is carried away from the filter cloth and drum over a snubbing roller as shown in the photographs, breaking loose by its own weight here and falling on to the belt conveyor previously mentioned. The cake is carried from the drum over to the snubbing roller on a series of cords about 1½ in. apart, resting on the drum and traveling around with it and over the roll. A strong fish line is used for this purpose.



Belt conveyor and drives from filters at Manitowoc cement plant

Cement silo for truck loading at Manitowoc cement plant



Agitator used on slurry tanks at the Manitowoc cement plant

The drum revolves at a speed of one revolution in about 3¼ minutes, and carries a cake 3/16 in. thick. The slurry going to the filter contains about 32½% moisture, and the cake coming from them about 18½%, about 43% of the moisture being thus removed.

The 25- to 26-in. vacuum under which the filters are operated is provided by three 23-in. by 10-in. Chicago Pneumatic Tool Co. vacuum pumps, each driven by a 40-hp., General Electric induction motor through a short center idler belt drive. Each filter is driven by a 3-hp. G. E. motor through a Reeves variable speed reducer. The three Stephens-Adamson belt conveyors carrying the cake from the filters to the feed screws are 20 in. wide by about 85 ft. long, driven by 5-hp., 720-r.p.m., General Electric induction motors through 70 to 1 ratio Cleveland worm gear reducers. The 14-in. feed screws are driven by 10-hp., 720-r.p.m., Allis-Chalmers induction motors through 7¼ to 1 ratio Cleveland worm gear reducers.

The total power used by the filtering equipment, including the vacuum pumps, is about 120 hp., or 40 hp. for each kiln.

This may be accounted for in part by the fact that the filtering is done more rapidly on a less filtering area and with a thinner cake than in the case of the disc filter, so that a less volume of vacuum space is required to be maintained. In this case less than half as much area of filter cloth is used as compared with the disc type on the same production, and the cloth is travel-

Two Milwaukee, Wis., cement packing plants. Left, Huron Portland Cement Co.; right, Petoskey Portland Cement Co.

ing more than twice as fast, delivering a cake only about half as thick. Two men look after the nine units, and the filter cloth has an average life of about 65 days.

From the standpoint of labor and power this would seem to be a very economical operation.

When the bulk cement carrier *Daniel McCool* was put into service in 1926, a Fuller-Kinyon pumping system was installed in the mill for such bulk shipments. This installation consists of two 8-in. Fuller-Kinyon pumps with 150-hp. motors, which deliver bulk cement at the rate of 800 bbl. per hour through two 6-in. pipes about 475 ft. long. In this way the *Daniel McCool* is loaded in about five hours.

Milwaukee Cement Packing Plants

Packing plants which receive their cement in bulk by boat are now operated at Milwaukee, Wis., by the Huron Portland Cement Co., Petoskey Portland Cement Co., and Manitowoc Portland Cement Co., and the Universal Atlas Cement Co. is also completing a similar plant which will receive cement in bulk by self-unloading barge from Buffington. These plants have storage silo capacities ranging from 20,000 to 175,000 bbl., from which cement is shipped either in bulk or bags by truck or rail.

They are built along the same general lines, using screw conveyors and bucket elevators to the packer bins. At the Huron plant the silos are filled from the boat by bucket elevator and screw conveyors, and at the other three plants by the Fuller-Kinyon pumping system. Sly and Norblo dust collector systems are used.

Hunting New Residential Building Materials

DARING plans to develop a kind of building material that does not now exist are under way at Massachusetts Institute of Technology, Cambridge, Mass.

These plans are the answer of science to the fire hazard, to the high cost of homes and the high expense of repairs. The aim is to put better homes in reach of everyone and to improve building generally.

Research has started under direction of Ross F. Tucker, professor of building construction.

"We do not know yet just how it will be done," he says, "but to find out how and to do it is one of the things this school is for. The new materials may be of gypsum or cement, or some entirely new materials.

"They may, among other things, use the wood bar instead of steel for reinforcement of concrete, to save weight. They must be something light enough so that two men can set them in place."

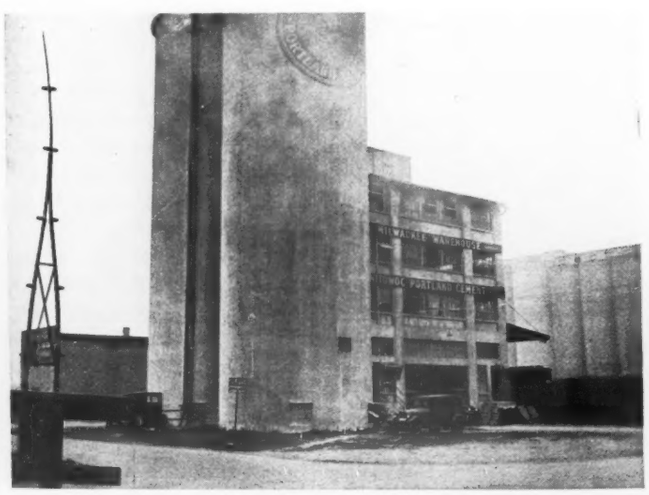
On Professor Tucker's desk lies an object resembling a large, white sponge. It is not much heavier than a sponge but nearly as hard as stone.

"This is cement that has been aerated," he says. "It illustrates possibilities. Chemicals caused this cement to 'rise,' as bread dough rises from effects of yeast. The compound gave off hydrogen, and expanded the cement into a structure made of thousands of air-tight cells, resulting in light, strong material.

"Man has improved many necessities, but for fifty years dwellings have been made of the same materials, and by the same hand labor. No way has yet been found to apply the methods of quantity production in construction of the modern home.

"We still use many of the tools and build by the methods of our forefathers, yet we spend about $6,000,000,000 a year for homes.

"We seek to make dwellings that can be erected by unskilled labor, be fire resisting, more durable, insulated from cold, and yet come within limits of home-owners' incomes."



Some efficient branch packing plants. At left is the Milwaukee plant of the Manitowoc Portland Cement Co., and the other is the new pack house of the Huron Portland Cement Co. at Toledo, Ohio

Gypsum and Gypsum Products Manufacture—Part V

Factors Which Affect Tensile Strength; Effect of Aging; Artificial Aging; Tests to Determine the Degree of Calcination

By S. G. McAnally

Chief Chemist, Giant Portland Cement Co., Egypt, Penn.; formerly Chemist for the Pacific Portland Cement Co., Mound House, Nev., and Chemist and Superintendent for the Standard Gypsum Co., Ludwig, Nev.

SINGLE- AND DOUBLE-BOIL GYPSUM PLASTERS harden quickly and attain a tensile strength of from 150 to 250 lb. per sq. in. in one hour, and from 200 to 300 lb. in 24 hours. These figures are based on tests of wet mixtures of a thick creamy consistency. The maximum strength of neat gypsum plasters (not Keene's cement) is between 500 and 600 lb. per sq. in. Solid raw gypsum has a tensile strength of about 250 lb.

Strength and hardness as applied to plaster are more or less synonymous terms; they are essential properties of all plasters. Quick hardening is an essential property of casting, molding and dental plasters. The latter are the "high-early-strength" plasters of the gypsum industry. The tensile strength of the best casting plasters equals 200 lb. in 45 min.; fresh plaster of paris requires about 24 hours to attain this strength.

Factors Affecting Tensile Strengths

The main factors (not including admixtures) which affect the strength of calcined gypsum are: Impurities in the plaster, fineness of raw kettle feed, degree and length of calcination, hot-pit storage, regrinding and aging.

Nearly all the impurities that are insoluble or slightly soluble in water lower the strength. Deliquescent and hygroscopic soluble salts increase the strength by causing the plaster to age. Soluble sulphates, as a rule, increase the strength slightly.

Coarsely ground raw gypsum produces denser and stronger plaster than does finely ground gypsum. Higher calcination also increases the strength, but the degree of grinding is the more potent factor. A coarsely ground gypsum calcined to 350 deg. F. will be stronger than a finely ground gypsum calcined to 380 deg. F. The results of tests which show the effects of calcining temperature and fineness (of raw material) on the tensile strength are shown in Table XII.

Editor's Foreword

AS IN THE CASE of portland cement pastes the most important factor affecting the strength of gypsum stucco, or plaster, is the water ratio. This article is therefore a very important one in that it deals with original experiments and investigations of the effect of fineness of grinding, calcining temperature, aging and the presence of impurities on the water ratio and tensile strength of gypsum stuccos.

The material in Test II, although coarser than that in Test I, cannot be considered as coarse, yet the results clearly show the effect of grinding on the strength. Calcination above 373 deg. F. (end of second boil and second settle) does not improve the early strength to any great extent.

The tests, Table XIII, on plasters calcined to the same temperature but having different fineness (raw feed), show the influence of the latter on the strength.

Long calcinations lower the water ratio and the plasticity, indeed, the latter are the properties which have a direct bearing on the strength of plaster. Comparison between long and short calcinations follows:

	Tensile strength		
	8 hours	1 day	6 days
Long calcination	210 lb.	285 lb.	530 lb.
Short calcination	210 lb.	212 lb.	330 lb.

Hot-pit storage improves the strength of single-boil plaster, but does not benefit double-boil very much in this respect. The reason may be attributed chiefly to the greater aging effect of hot-pit storage on single-boil than on double-boil, as shown in a previous article. The effects of hot-pit storage on the tensile strength of plasters calcined to various temperatures follow:

TEST I

Calcining temperature	Held in hot-pit	Tensile strength 22 hr.
350 deg. F.	0 hr.	172 lb.
350 deg. F.	2 hr.	190 lb.
350 deg. F.	9 hr.	215 lb.

TEST II

Calcining temperature	Held in hot-pit	Tensile strength 1 day
340 deg. F.	0.0 hr.	140 lb.
340 deg. F.	0.5 hr.	147 lb.
340 deg. F.	1.0 hr.	157 lb.
340 deg. F.	1.5 hr.	164 lb.
340 deg. F.	2.0 hr.	166 lb.

TEST III

Calcining temperature	Held in hot-pit	Tensile strength 45 min.
372 deg. F.	0.0 hr.	135 lb.
372 deg. F.	0.5 hr.	128 lb.
372 deg. F.	2.5 hr.	136 lb.

TEST IV

Calcining temperature	Held in hot-pit	Tensile strength 45 min.	2 hr.
390 deg. F.	0 hr.	131 lb.	140 lb.
390 deg. F.	2 hr.	127 lb.	140 lb.

Regrinding reduces the strength slightly and in proportion to the increased fineness and water ratio. See Table XIV.

Aging has the greatest effect on the strength of gypsum plaster. Quoting from a *Technical News Bulletin* of the U. S. Bureau of Standards, "calcined gypsum . . . has been found to deteriorate upon aging, as

TABLE XII SHOWING EFFECT OF FINENESS OF GRINDING AND CALCINING TEMPERATURE ON WATER RATIO AND TENSILE STRENGTH

	Raw fineness	Calcining	Water	Tensile strength	
Test I:	200-mesh	temperature	ratio	45 min.	2 hr.
Sample No. 1	84.0%	350 deg. F.	104%	.....	80 lb.
Sample No. 2	84.0%	370 deg. F.	104%	.....	80 lb.
Sample No. 3	84.0%	370 deg. F.	98%	.....	90 lb.
Sample No. 4	84.0%	375 deg. F.	97%	.....	95 lb.
Sample No. 5	84.0%	385 deg. F.	92%	.....	103 lb.
Test II:					
Sample No. 20	69.0%	340 deg. F.	95%	110 lb.	90 lb.
Sample No. 21	69.0%	373 deg. F.	90%	132 lb.	142 lb.
Sample No. 22	69.0%	382 deg. F.	87%	136 lb.	148 lb.
Sample No. 23	69.0%	393 deg. F.	82%	139 lb.	157 lb.
Sample No. 24	69.0%	400 deg. F.	82%	142 lb.	147 lb.
Sample No. 25	69.0%	410 deg. F.	79%	148 lb.	144 lb.
Sample No. 26	69.0%	415 deg. F.	75%	141 lb.	160 lb.

(The consistency of all mixtures was the same.)

TABLE XIII SHOWING EFFECT OF FINENESS OF GRINDING WITH SAME CALCINING TEMPERATURE

Fineness of raw 200-mesh	Fineness of plaster	Water ratio	Tensile strength 1 day	3 days	7 days
65.0%	65.0%	54.5%	288	553	460
79.0%	79.0%	61.5%	215	409	450
85.0%	85.0%	67.5%	225	420	400
96.0%	96.0%	69.5%	218	392	388

TABLE XIV SHOWING EFFECT OF CALCINING PLASTERS AT SAME TEMPERATURE BUT WITH DIFFERENT FINENESS TO INDICATE FINENESS AND STRENGTH

Fineness of raw 200-mesh	Fineness of plaster 200-mesh	Tensile strength 1 day	3 days	7 days
65.0%	65.0%	288 lb.	553 lb.	460 lb.
65.0%	85.0% (reground)	278 lb.	548 lb.	455 lb.

	45 min.	2 hr.
Plaster reground from 55% to 78%, 200-mesh	129 lb.	129 lb.
Plaster reground from 55% to 87%, 200-mesh	128 lb.	123 lb.

is evidenced by poorer working qualities after a storage period of some months."

Aging deteriorates calcined gypsum that is to be used for hardwall plasters, but aging improves casting and molding plasters; the best of the latter products on the market are aged products.

Plaster that has been stored for some time in bins may show poorer working qualities, but it is not truly aged. Aged plaster is higher in water content than fresh plaster; plaster stored in hot-pit or in bins is usually lower in water content than the freshly calcined material. Such storage only ages the plaster in so far as any water liberated, by the continued calcination, is reabsorbed by the cooler portion of the stored plaster. The continued calcination produces changes in the plaster; e.g., lower water ratio, lower plasticity and quicker set, corresponding to the degree of dehydration, yet the lowering of the water ratio by higher calcination, or by storage at fairly high temperatures does not increase the strength to the same extent as would an equal lowering of the water ratio by aërating or aging, as the following tests show:

TABLE SHOWING EFFECTS OF HOT-PIT STORAGE AND ARTIFICIAL AGING ON WATER RATIO

Material	Water ratio	Tensile strength 45 min.	2 hr.	Combined water in fresh plaster
Double-boil	90%	138 lb.	146 lb.	0.92%
Same material held in hot-pit 2½ hr.	61%	142 lb.	160 lb.	.....
Single-boil	97%	112 lb.	110 lb.	5.23%
Same material aged artificially	63%	197 lb.	215 lb.	.....

Aging Gypsum Plasters

When gypsum plasters (not Keene's cement) are exposed over water they revert to raw gypsum. Samples were exposed in this manner for one month. The gain in weight is shown in the tabulated results.

TABLE SHOWING REVERSION OF PLASTER TO GYPSUM ON EXPOSURE OVER WATER

	Raw gypsum	Single-boil	Double-boil
H_2O content, fresh	17.70%	5.21%	1.17%
H_2O content after one month	17.91%	17.54%	18.05%
Gain after 1 day exposure	0.00%	3.55%	6.12%
Gain after 2 days exospre	0.25%	4.55%	9.00%
Gain after 7 days exposure	0.30%	6.15%	17.75%
Gain after 14 days exposure	0.57%	10.98%	21.70%
Gain after 28 days exposure	0.25%	14.95%	20.60%

If deliquescent soluble salts are mixed with plaster in considerable quantity (over 1%), the plaster will eventually revert to raw gypsum.

The above causes or conditions bring about chemical hydration of the plaster, and not aging in the desired sense.

Plasters which do not contain deliquescent salts may be stored in air for over a year without becoming hydrated to gypsum. Analyses of plasters after storage in air for various periods follow:

TABLE SHOWING EFFECTS OF STORAGE IN AIR

Material	Age	H_2O content
Single-boil	Fresh	5.57%
Single-boil	2 mo.	6.23%
Single-boil	3 mo.	6.10%
Single-boil	Fresh	5.08%
Single-boil	17 mo.	5.28%
Partial double-boil	Fresh	3.08%
Partial double-boil	2 mo.	5.95%
Partial double-boil	3 mo.	5.67%
Double-boil	Fresh	0.61%
Double-boil	16 mo.	4.21%
Double-boil	Fresh	0.77%
Double-boil	21 mo.	4.31%
Double-boil	Fresh	0.30%
Double-boil	4 hr.	0.59%
Double-boil	2 days	2.30%
Double-boil	1 mo.	4.00%
Double-boil	5 mo.	4.22%

It is interesting to note in connection with the above tests that the freshly calcined material containing less than 1% of combined water does not entirely revert to the hemi-hydrate. This would indicate that some of the plaster had been dead-burned. Dead-burned gypsum, to which class Keene's cement belongs, does not hydrate on exposure to air after several years' exposure.

Aged plaster of paris usually contains a percentage of water slightly in excess of that in the hemi-hydrate. Assuming that the theoretical quantity in the latter is 5.70% and that the aged plaster contains 6.0%, any attempt to duplicate the aged product, by controlling the calcination so that the calcined material will contain 6.0% water, is unsuccessful. Aging of plaster causes a physical change which is evidenced by a considerable increase in density (weight per cubic foot), lowering of the water ratio and the plasticity. Coarsely ground calcined gypsum may have a water ratio as low as aged plaster, but the former is plastic (sticky); the latter is not plastic. Aged plaster mixes easily with water in all proportions without forming lumps; fresh plaster does not.

Moisture is essential for aging, but until all the soluble anhydrite has been converted to the hemi-hydrate by the absorbed moisture, the latter does not function as an aging medium. The quantity of water or moisture required to age plaster is less than 1%, and, strange as it may seem, the rapid addition of a great excess of moisture (2% to 4%) does not achieve the desired aging effect. Hydration takes place, and the plaster becomes lumpy, quick setting and lacks strength. Aged plaster is slower setting than fresh plaster and attains greater strength, especially at the early periods. The results of tests in Table XV show some of the effects of aging.

The following results show the comparison between freshly calcined plasters, at different temperatures, and the same plasters aged artificially (rapid aging):

FRESH PLASTER

Calcining temperature	Water ratio	Tensile strength 45 min.	2 hr.
345 deg. F.	97%	112 lb.	110 lb.
371 deg. F.	89%	132 lb.	135 lb.
393 deg. F.	79%	141 lb.	143 lb.

ARTIFICIALLY AGED PLASTER

Calcining temperature	Water ratio	Tensile strength 45 min.	2 hr.	1 da.
345 deg. F.	63%	197 lb.	216 lb.	222 lb.
371 deg. F.	60%	208 lb.	212 lb.	206 lb.
393 deg. F.	61%	169 lb.	180 lb.	215 lb.

The above results show that aged single-boil stucco makes a very strong early strength plaster suitable for the manufacture of casting, molding and finishing.

As stated in a previous article, the pressed volume of a plaster (dry powder) has a direct ratio to the wet volume, when the plaster is produced from the same raw gypsum, by the same process, and not reground. Aged plaster is bulkier, when loosely packed, than fresh plaster, but when the plasters are packed under pressure the fresh material is the bulkier; i.e., it weighs less per cubic foot than aged material. Density determinations on the finely ground raw gypsum, the freshly calcined single-boil plaster and on the latter aged, gave the following:

	Wt. per cu. ft.
Raw gypsum, pressed	80.9 lb.
Single-boil plaster, pressed	71.7 lb.
Aged single-boil plaster, pressed	77.2 lb.

Due to its lesser pressed volume, it is to be expected that the wet volume of the aged plaster will be less than that of the fresh;

TABLE XV SHOWING EFFECTS OF AGING ON TENSILE STRENGTHS OF VARIOUS PLASTERS

Material	Age	Method of aging	Combined water	Setting time	Water ratio	Tensile strength, lb. 2 hr.	1 da.	7 da.
Single-boil	1 day	In air	.....	.....	90%	110	165	.....
Single-boil	1 year	In air	.....	.....	62%	175	195	.....
Single-boil	1 day	In air	5.08%	33 min.	55%	.....	142	347
Single-boil	17 mo.	In air	5.28%	39 min.	47%	.....	171	386
Double-boil	1 day	In air	0.77%	20 min.	62%	.....	177	418
Double-boil	21 mo.	In air	4.31%	30 min.	50%	.....	228	461
Double-boil	1 day	In air	0.61%	13 min.	55%	.....	178	380
Double-boil	16 mo.	In air	4.20%	28 min.	45%	.....	251	418

and, as the wet volume depends on the water ratio, the water ratio of the aged material will be lower than that of the fresh plaster; this has been shown already in the various tests.

Tests to Determine Effect of Degree of Calcination

Nearly all kettle products are dehydrated beyond the theoretical hemi-hydrate, and it may be assumed that aging is caused by the plaster reverting to the hemi-hydrate. If this were true, then a plaster calcined to contain a water content in excess of or equal to that of the hemi-hydrate would not age or deteriorate, it being understood that aging does not mean reversion to raw gypsum. To prove or disprove the above assumption, samples of plaster were taken from the same kettle load at 290 deg. F. and at 350 deg. F. They were analyzed and tested, when fresh, for water ratio and setting time, and a portion of each was exposed to the air for seven weeks and then retested. The results of both tests follow:

Calcining temperature	Fresh plaster: Combined water	Setting time	Water ratio	Plaster aërated 7 weeks: Combined water	Water ratio
290 deg. F.	5.79%	32 min.	85%	5.93%	65%
350 deg. F.	4.40%	46 min.	85%	6.05%	66%

Based on the water ratio, the 290 deg. F. material had deteriorated more than the 350 deg. F. material. Tests on both materials showed that the increase in the water content, due to aëration, was greater after 19 hours than after 7 weeks, yet the plasters had deteriorated very little after 2 days' aëration. Periodic analyses follow.

TABLE SHOWING RATE OF ABSORPTION OF MOISTURE DUE TO AERATION

	290 deg. F. material	350 deg. F. material
Combined water in fresh plaster	5.79%	4.40%
Water absorbed after 2 hours	0.25%	1.41%
Water absorbed after 19 hours	0.30%	1.91%
Water absorbed after 24 hours	0.27%	1.81%
Water absorbed after 2 days	0.29%	1.89%
Water absorbed after 11 days	0.24%	1.71%
Water absorbed after 42 days	0.15%	1.76%
Water content after 19 hours	6.07%	6.19%
Water content after 42 days	5.93%	6.05%

The above material calcined to 290 deg. F. contained more combined water than the theoretical quantity in the hemi-hydrate, yet it absorbed an additional amount of moisture on exposure to air and deteriorated or aged in the same manner as plaster of paris.

Gypsum calcined to 295 deg. F., and stored in the hot-pit one hour to complete dehydration to the hemi-hydrate, produces a good grade of casting and finishing plaster when it is aged. The writer has used this material in the manufacture of the above finished products by his aging process (U. S. Patent No. 1,713,879). Less moisture is required for aging the lower calcined material. However, the complete aging effect does not occur at once, as it does when plaster of paris is used, but only after three or four days storage in sacks, or in a storage bin, if such storage is more convenient.

There are two other patented processes for aging calcined gypsum; in H. E. Brookby's process (U. S. Patent No. 1,370,581) the plaster, during or after calcination, is mixed with a small percentage of deliquescent compound; in J. H. Colton's process for aging calcined gypsum, raw gypsum and borax, in definite proportions, are added to the plaster at a certain stage of the calcination (U. S. Patent No. 1,659,971).

Aging is deleterious to plaster that is to be used for fibered and unfibered hardwall; it lowers the plasticity and the sand-carrying capacity, and retards the setting time considerably. To the plasterer, aged fibered hardwall is "dead." Plaster stored in sacks ages quickly. Paper (5-ply) sacks resist aging better than do cloth sacks.

Factors Affecting Aging

Some plasters age quicker than others. Deliquescent and hygroscopic salts when present in plaster cause it to age rapidly and in proportion to the amount present. The degree of calcination and the fineness of the plaster are other factors that have an influence on the rate of aging. Very finely ground calcined gypsum (not reground) has a high sand-carrying capacity when fresh, but appears to deteriorate quickly. The maximum fineness for the best results will vary for different gypsums, but the average limit is about 92% passing the 100-mesh sieve.

	Water ratio: Fresh	Aërated 11 days	Difference
Plaster, without admixture	78%	68%	10%
Plaster, plus 3% diatomaceous earth	91%	73%	18%

Clayey materials promote aging. It is a characteristic of gypsite plaster that it does not have a high water ratio when freshly calcined; it appears to be already aged, has a low sand-carrying capacity, but attains greater strength than freshly calcined single- or double-boil "gypsum" plasters. The gypsite contains a siliceous material somewhat similar in texture to diatomaceous earth. The impurity, whatever it is, holds water tenaciously and even hinders calcination, as evidenced by the greater fuel consumption as shown in the following:

Three calcinations were made in succession in the same 10-ton kettle. The first charge consisted of ground raw gypsum, the second of half raw gypsum and half dry gypsite, and the third charge of dry gypsite only. The calcination was carried to the same temperature for each charge, 345 deg. F. The fuel oil consumption for each charge is given below.

Kettle load of gypsum..... 61 gal.
Kettle load half gypsum, half gypsite 69 gal.
Kettle load of gypsite only..... 80 gal.

It is claimed that the addition of 5% ball clay to plaster will increase the tensile strength. This increase can only be attributed to the quick aging action of the moisture in the clay, or to the hygroscopic nature of the dry clay, if such were used, causing the plaster to age in a short period. The addition of clay to aged plaster would lower the strength of the latter.

If diatomaceous earth is mixed with plaster, the water ratio will be increased, temporarily, but if the mixture is aërated it shows a greater decrease in the water ratio than does the pure plaster that has been aërated for the same length of time. Tests are shown at bottom of page.

Based on the above results and on the peculiar properties of gypsite plaster, it may be possible to produce a plaster having a low water ratio and greater strength, than fresh plaster of paris, by merely adding to the kettle charge some siliceous material such as diatomaceous earth, bentonite, volcanic ash, etc.

(To be continued)

Iowa Contractor Finishes Road Job at 4 A. M.

CRUSHED ROCK SURFACING on the county road running from a junction with primary road No. 61 to Elwood, Iowa, was finished at 4 o'clock in the morning, October 22, by night shift crews, used to bring the project to a speedy finish.

The work was let to Contractor A. A. Hurst, Maquoketa.—*Clinton* (Iowa) *Herald.*

Western Pennsylvania's Newest Crushed Slag Plant

Cashion Slag Co., Donora, Has Compact and Simplified Screening Practice as Outstanding Feature

MANY OF THE SLAG PLANTS throughout the United States, especially the older operations, have flow sheets so complicated that at times it is bewildering to follow the progress of the slag through the various processing steps. Modern practice and the necessity for utmost economy today dictate that a plant, be it for making crushed slag or other product, must have simplicity of operation a basic consideration. This statement sums up the outstanding feature of the new plant of the Cashion Slag Co., built during the spring of 1930, at Donora, Penn. Donora is one of the many towns along the Monongahela river some 35 miles south of Pittsburgh. The plant is about two miles north of Donora and between that town and Monongahela.

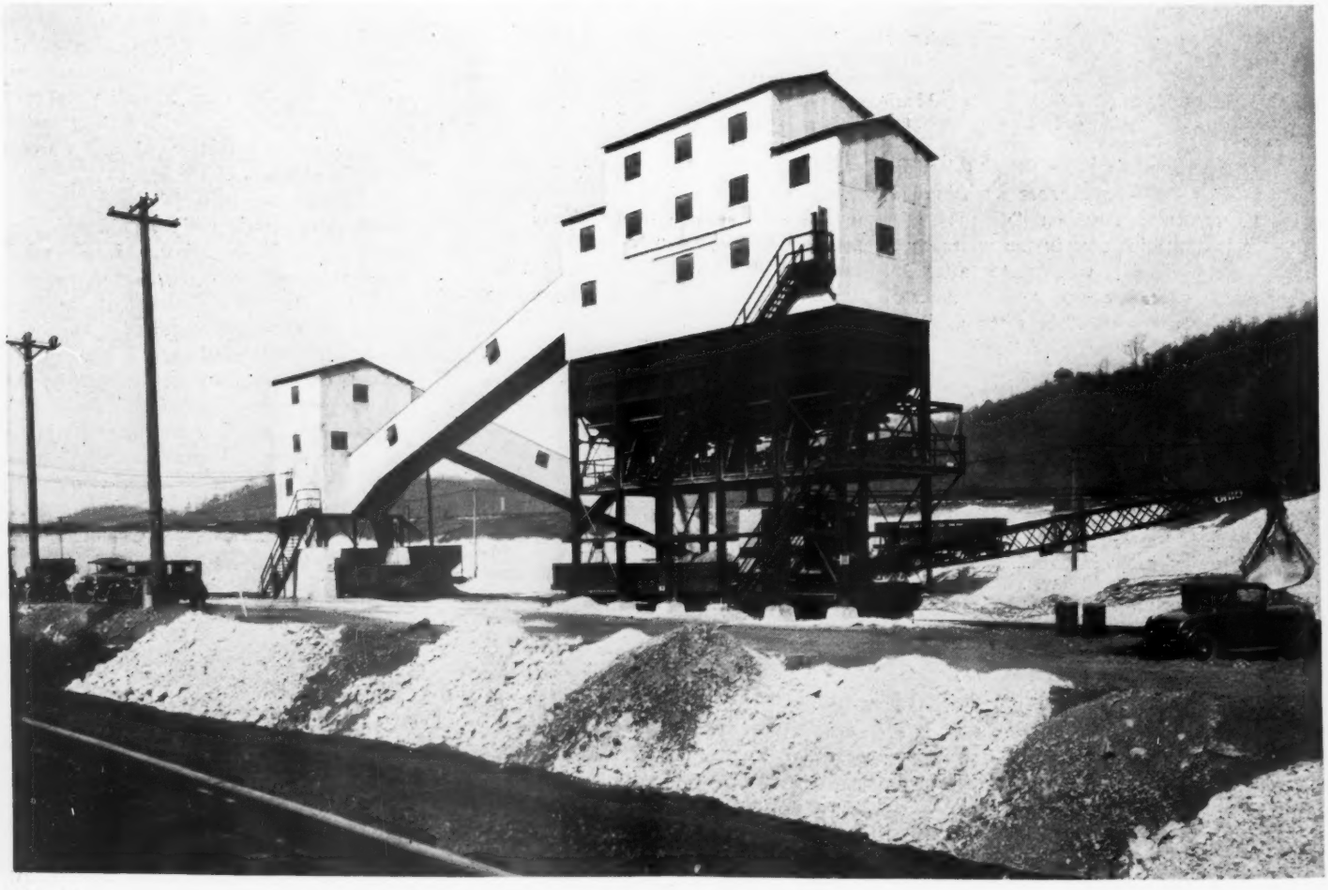
The Cashion Slag Co. has its main office at Butler, Penn., and the president and general manager, J. E. Cashion, has a wide diversity of interests in the by-product business incidental to the production of iron and steel in western Pennsylvania. This includes bank-run slag, granulated slag, etc. Sales representatives have offices at Greensburg, Penn., Fairmont, W. Va., and Monongahela, Penn.

The new crushing plant, which is the company's first venture in this particular phase of the slag industry, was designed and built by the Robins Conveying Belt Co., with the structural steel fabricated and erected by the Lackawanna Steel Construction Co. of Buffalo, N. Y. The plant is of steel construction throughout with concrete foundations and has been erected in such a manner as to be a credit to the owners and designers. The plant has been in operation since July of this year.

With the exception of the primary crusher, which is belt driven, and the Gyrex vibrating screens, which are Texrope driven, the various conveyor units, secondary crusher, etc., are driven through Falk herringbone gear reduction units that are direct connected to the source of power, with Falk high speed couplings and Robins couplings on the low speed side. General Electric motors are used throughout and where the motor is expected to be subjected to dust, totally enclosed types of motors are used. The belt conveyors are all Robins as are the carrier and return rolls. The troughing rolls are equipped with Timken tapered roller bearings, while the return rolls have Hyatt roller bearings.

Slag Deposit

At present a long cut paralleling the slag dump adjacent to the plant is being



General view of the new slag plant of the Cashion Slag Co., Donora, Penn.

opened up; and the slag from the current production of iron and steel at the Donora plant of the American Steel and Wire Co. is being dumped at the back end of this cut.

The main body of the slag dump is about 10 to 15 years old and was for the most part poured during the hectic days of the World War. As an aftermath of the forced production in the steel industry, the slag company occasionally runs into unusually large chunks of metallic iron embedded in the bank.

As a result, considerable caution is exercised in seeing that no large pieces of iron are fed to the 16-in. Telsmith primary gyratory crusher. To facilitate this sorting operation a 36-in. inclined pan conveyor is installed under the track hopper and an attendant sees that no large chunks of metallic material reach the primary crusher.

Also care is exercised at the 8-in. by 9-in. grizzly, that is constructed over the track hopper, to distinguish any large chunks of slag from iron before hand sledging to the hopper below. Any smaller pieces of iron are effectively removed at the head of the No. 1 belt conveyor by a Dings magnetic pulley, which discharges the iron to a standard-gage gondola railway car below. All iron is returned to the steel company which pays the slag company for the material. The rate of pay for this product was said to be several times the current value of commercial slag.

A general view of the primary crushing operation

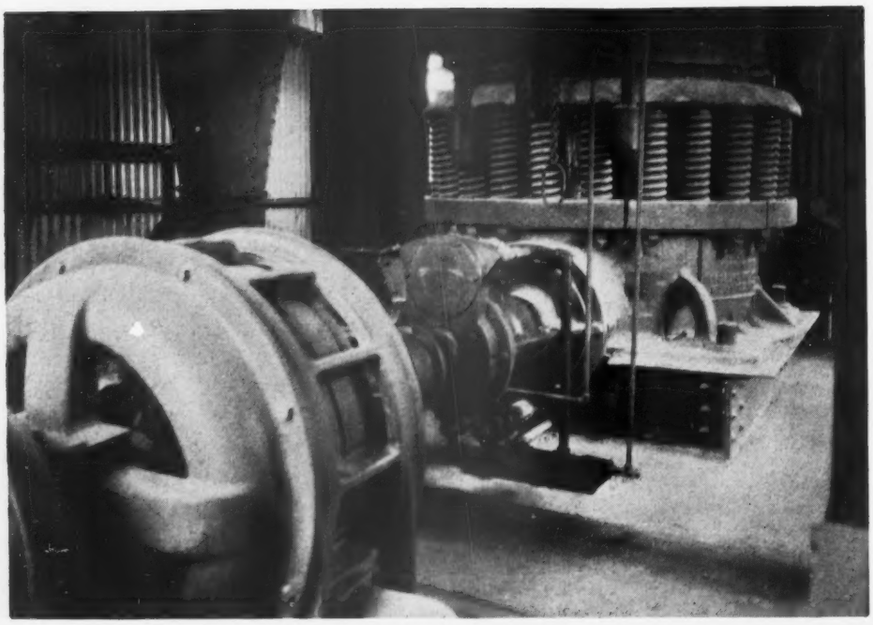
Loading slag from the older portion of the bank

Dumping slag from American Steel and Wire Co. plant

Pan conveyor discharging to the primary gyratory crusher

The slag in the bank has partially recemented on standing for such a long time and as a result has to be shaken up with light charges of blasting powder. For this work a well drill is used for primary drilling and black powder for the explosive. Also, due to the slight dampness of this old slag, dust in the plant is practically negligible.

The slag from the pit is loaded by a 50-B Bucyrus crawler-tread electric shovel, having a 1¾-yd. dipper, which loads to standard-gage, drop-bottom gondolas that are spotted over a steel and

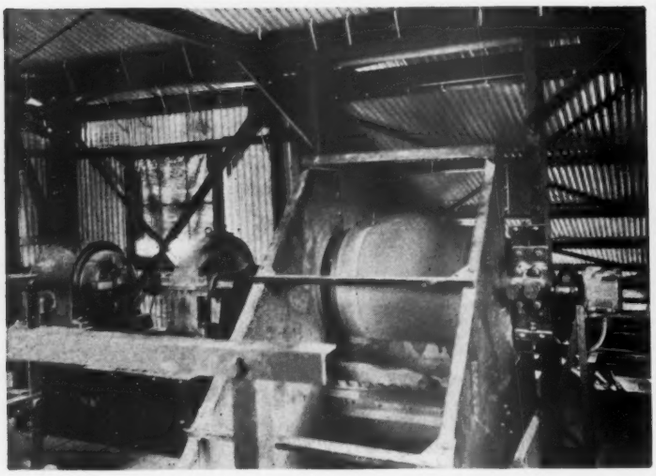


Secondary crusher and drive

tion unit. The cone crusher is driven by a 50-hp. induction motor with the 16-in. crusher driven by a 75-hp. motor.

When desirable a bar grizzly is installed ahead of the cone crusher and only the oversize crushed, the crusher's discharge and the fines from the cone crusher will join on conveyor belt No. 2 and be elevated to the screening house. Or, at the option of the operators the product can be bypassed around the Symons cone crusher and go direct to the screening plant.

Conveyor No. 2 elevates the material to the vibrating screens mounted over the five steel bins, where the crushed slag passes over a battery of three Robins Gyrex screens arranged in a single row so that the material cascades from the top screen down over the other two. The two top vibrating screens are 48 by 102 in. and the lower is 42 by 72 in. and are provided with ¾-in., 1½-in. and 2½-in. meshed manganese wire cloth, with the smaller mesh being at the top screen, the



The conveyor belt from the primary crusher can discharge directly to the cone crusher below or to a grizzly

The 16-in. gyratory primary crusher feeds a belt conveyor

concrete hopper at the plant. The switching equipment, both engine and cars, is operated under lease from the American Steel and Wire Co.

Crushing and Screening

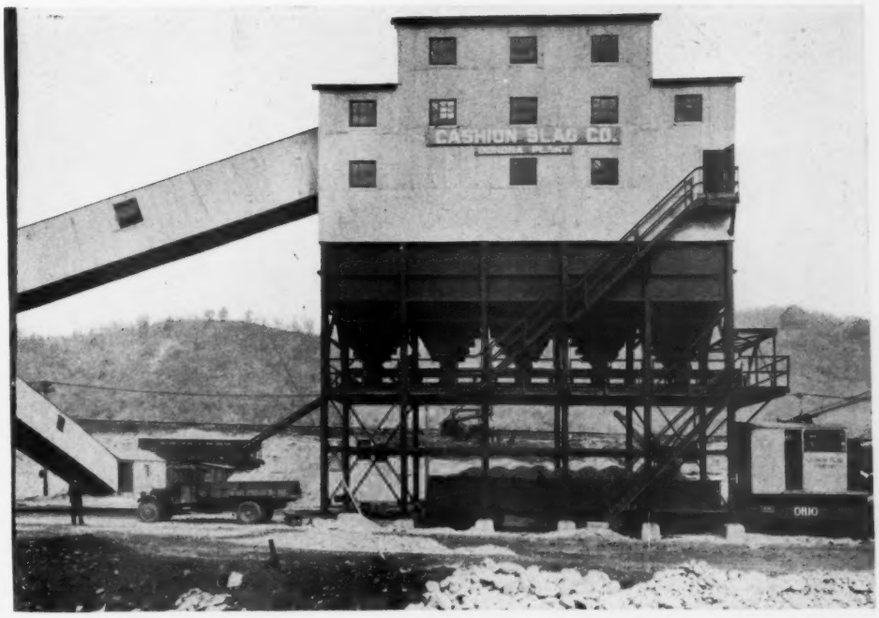
Under the track hopper is a reciprocating pan feeder that feeds to both sides of the 36-in. inclined pan conveyor serving the Telsmith crusher. The reciprocating feeder is driven through adjustable stroke eccentrics with a right-angled reducer connecting the 7½-hp. motor and the feeder. The material after passing this crusher falls to belt conveyor No. 1, the details of which are appended to this article, and is elevated to a point over the 3-ft. Symons cone crusher. This conveyor has the head pulley equipped with a Dings magnetic pulley, and is driven by a 15-hp. General Electric totally enclosed, induction motor through a Falk herringbone gear reduc-

Reciprocating pan feeder discharges to a pan conveyor

1½-in. on the middle screen and the 2½-in. on the lower screen. All are single-deck and each is driven by a 3-hp. General Electric motor through a Texrope drive.

The vibrating screen house and the arrangement of the screens is notable for its compactness, yet everything is readily accessible to the operator.

The fines from the upper deck (minus ¾-in.) fall to a short horizontal 16-in. belt conveyor that delivers to a fourth Gyrex screen 42 by 72 in., that has ¼-in. wire cloth. This screen has a light chain riding on its deck that acts to help clear the openings in the wire cloth.

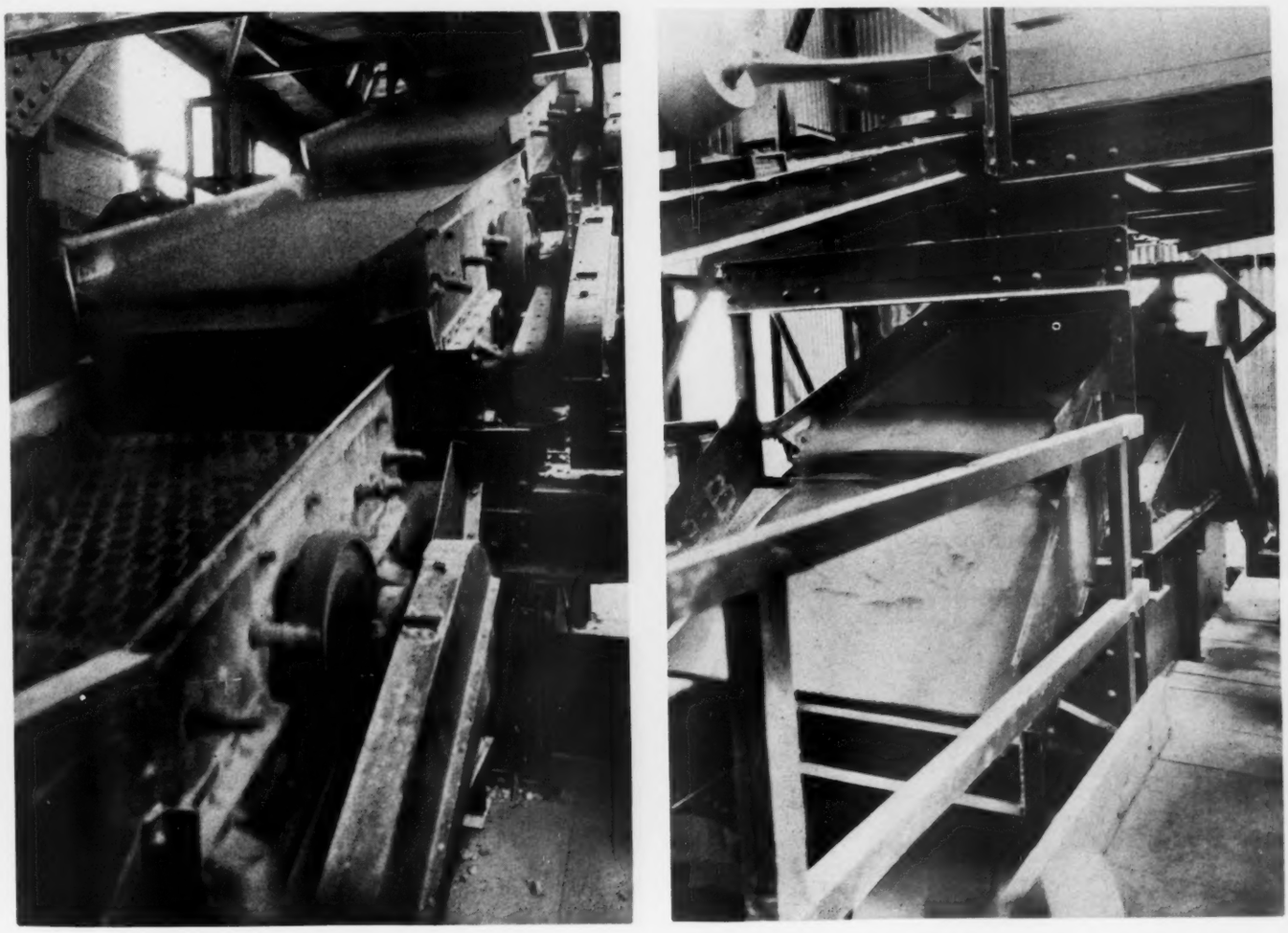


The vibrating screens are mounted in this steel structure over the bins

Products and Shipping Facilities

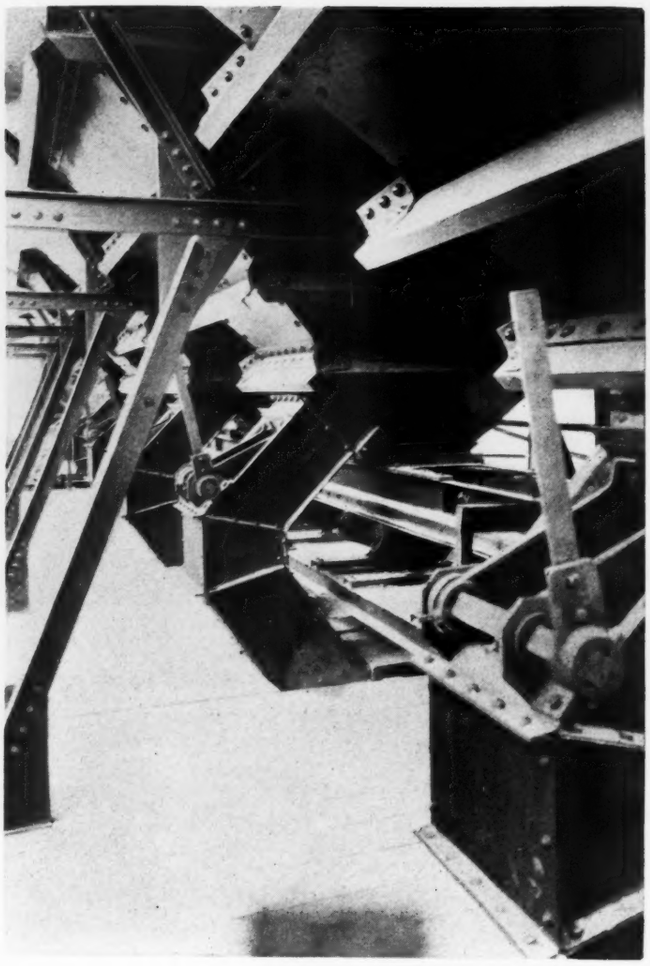
The five products from this battery of screens all fall to steel bins below from which the material is drawn to trucks and gondolas for shipment or for outside storage. The company at present has about 50,000 tons in storage that is reclaimed by a 25-ton gasoline-driven Ohio crane mounted on standard railroad trucks. A ¾-yd., gas-air, Erie shovel is also available for this work.

Considerable of this material is shipped by trucks there being 150 or more truck loads per day going from this plant. Shipments are also made over the rails of the Pennsylvania Railroad which runs past the plant and by barge on the Monogahela river. The slag from the steel mills is de-

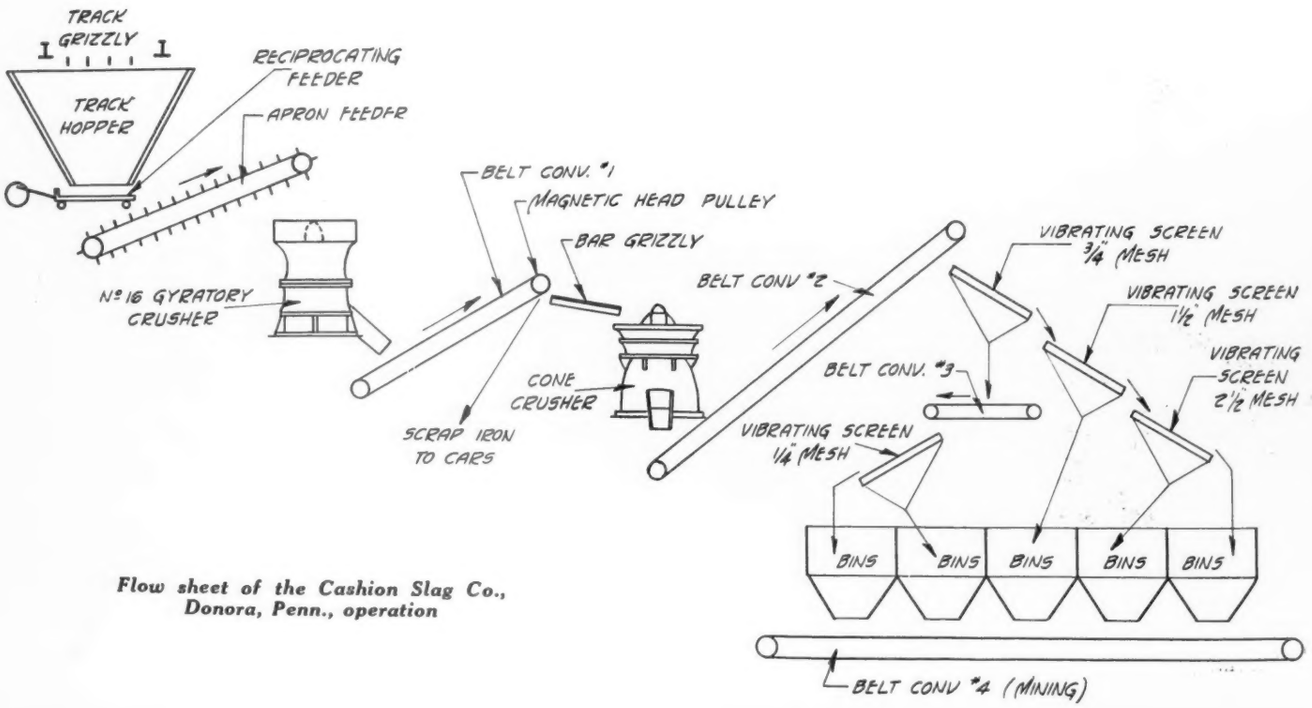


Vibrating screens at left show compact mounting and view at right is of a screen mounted below those delivering larger sizes and is used for screening the finer material

Close-up of one of the chutes from the loading bins that can deliver to a mixing belt or direct to the cars by the by-pass



Looking along the mixing belt from which the five hopper-bottomed bins feed to the belt by an unusual by-pass arrangement



Flow sheet of the Cashion Slag Co., Donora, Penn., operation

Part of the stock piles and loading equipment for reclaiming from storage

Clamshell rig reclaiming from large storage pile as one of its duties

livered to the cooling pits by the Donora and Southern Railroad Co.

The slag from this operation weighs from 80 to 85 lb. per cu. ft., all of which is sold on a weight basis with the truck shipments being weighed on Howe scales that are owned by the company and on railroad scales for the car shipments. The plant's Howe scales are provided with a Weightograph for quick reading.

Under the five steel bins runs a 24-in. belt conveyor that is used for a mixing belt and in the event that recombined aggregates are desired. The belt can also be used for loading trucks or for loading two different cars at the same time as one load can be drawn direct from the bins by a bypass that goes around the loading point on the belt and the second can be loaded from the belt.

The bypass, previously referred to is a novel arrangement, and was designed by the engineers of the Robins Conveying Belt Co., so that the mixing belt could be loaded from a bin or the contents of the bin could be loaded direct to the cars without using the belt. These two operations can also be carried on simultaneously.

Personnel

The executive offices of the Cashion Slag Co. are at Butler, Penn. J. E. Cashion is president and general manager; George E. Howard, vice-president; Elias Ritts, secretary and treasurer; J. W. Frazier, chief engineer; W. M. Lunan, superintendent, and J. F. Long is in charge of the plant office. The plant has a capacity of 1500 tons of slag per 10-hr. day and requires only 10 men for complete operation.

Following are the essential details of the various conveying units:

CONVEYOR DATA, CASHION SLAG CO., DONORA, PENN.

	Width in.	Hp.	Type drive	C./C. Length	Rise	Ft./M.	Tons /hr.	Ply	Ratio of red.
Incline apron feeder	36	10	6DA	34 ft. 8¾ in.	13 ft. 0 in.	74	150	..	52.3:1
Belt Conveyor No. 1	30	15	.....	158 ft. 3¾ in.	48 ft. 6 in.	225	150	5	.....
Belt Conveyor No. 2	24	10	6DA	116 ft. 11⅜ in.	35 ft. 6 in.	225	150	5	24.4:1
Belt Conveyor No. 3	16	5	2DA	18 ft. 2 in.	4 ft. 8½ in.	142	33	4	42.8:1
Belt Conveyor No. 4*	24	3	.....	48 ft. 6 in.	.....	320	250	4	.....

*Mixing belt.

All belts have ⅛-in. rubber top and 1/32-in. bottom with 28-oz. duck.

Operating staff of the Cashion Slag Co., left to right, J. W. Frazier, chief engineer; J. F. Long, plant office, and W. M. Lunan, superintendent

Talc and Soapstone in Canada in 1929

THE PRODUCTION of talc and soapstone in Canada during 1929 was valued at $229,198, as compared with a value of $219,358 in 1928, according to finally revised statistics just issued by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa.

The Quebec production consisted of soapstone blocks and powder shipped from a quarry in Broughton township. Ontario operators near Madoc, Hastings county, shipped 15,463 tons of talc during the year. A small shipment was made from a talc deposit in the Lillooet mining division, B. C.

Talc and soapstone, ground or unground, imported into Canada during 1929 amounted to 5,516 tons worth $109,675. Exports of talc totaled 11,399 tons appraised at $139,096.

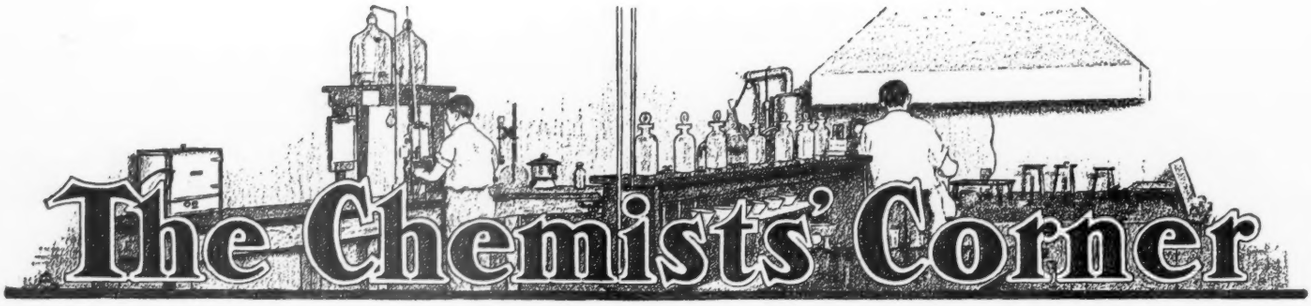
The five firms operating in this industry reported a total capital investment of $654,635. Employment was furnished 9 salaried employes and 77 wage-earners; their combined earnings were $74,300. Fuel and electricity used during the year cost $21,395.

PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF TALC AND SOAPSTONE, 1929

	Quantity tons	Value
Production:		
Soapstone	.....	$ 47,986
Talc	15,509	181,212
Total	.....	$229,198
Imports: Talc or soapstone, ground or unground	5,516	$109,675
Exports: Talc	11,399	139,096

PRINCIPAL STATISTICS OF THE TALC AND SOAPSTONE INDUSTRY IN CANADA, 1928 AND 1929

	1928	1929
Number of firms	5	5
Capital employed	$732,608	$654,635
Number of employes:		
On salary	9	9
On wages	82	77
Total	91	86
Salaries and wages:		
Salaries	$ 17,410	$ 13,705
Wages	$ 67,751	$ 60,595
Total	$ 85,161	$ 74,300
Cost of fuel and electricity	$ 21,850	$ 21,395
Selling value of products	$219,358	$229,198



Analysis of Complicated Concrete Mixes

By J. L. Heitzman
Chief Chemist, E. L. Conwell & Co., Philadelphia, Penn.

IN THE INVESTIGATION of the causes of failures of concrete many of us are called upon to determine the proportioning of the mix used. This arises from the complaint of the customer who will invariably place the blame on the cement. This determination, where sand and gravel or pebbles were used as aggregate, is as a rule, a matter of simple solution and calculation, but in concretes containing cinder, fine and coarse slag, crushed stone, etc., it is the usual custom to say that such an analysis is impossible and let it go at that.

No analysis of concrete made to determine the proportioning can be strictly accurate, but with patience, care and attention to details, the use of the methods outlined below will give surprisingly close results.

The writer has investigated this subject and has conducted considerable research during the past few years. It is from this study that the methods have been evolved and results obtained in actual analyses have been upheld in the courts in several instances, principally based on the suits of infringement of the patent relating to the well known Straub cinder building block. Among the cases under litigation the following may be cited:

Crozier Straub vs. Melmod, Downer and Graham, Trenton, N. J.
Crozier Straub vs. Reiter, Philadelphia, Penn.
Crozier Straub vs. Lampus, Pittsburgh, Penn.
Crozier Straub vs. Abbott, Newark, N. J.
Crozier Straub vs. Landis, Erie, Penn.
Crozier Straub vs. Maryland Concrete Corp., Baltimore, Md.

Extreme accuracy is not claimed, but the results obtained, as a rule, show with greater accuracy the actual composition of the material over that claimed by the fabricator using the usual methods of proportioning by scoop-shovel or wheelbarrow, without consideration of the bulking due to moisture or the voids due to the size and shape of the aggregate. Small errors arising from omission of details often lead to erroneous conclusions and results and unless the analyst is imbued with great patience the work had better be placed in other hands.

Preparation of Sample

The sample should weigh from 10 to 25 lb. and should be thoroughly representative of the work from which it was taken. To break out a piece of concrete from a certain spot is of little value. Three or more samples should be taken from different places. They may then be analyzed separately or may be combined.

The sample should then be broken down to a convenient size with a heavy hammer, on a steel plate, and examined to determine the nature of the coarse aggregate. If the coarse aggregate is crushed stone, several pieces should be thoroughly cleaned from adhering cement and sand and subjected to at least a qualitative examination. If it is crushed trap rock or other insoluble material it can as a rule be separated in the coarse state by heating the sample in a muffle and plunging it into water. By this treatment the cement and fine aggregate are disintegrated and are easily removed from the coarse stone and the latter may be weighed at once.

If the qualitative examination showed the coarse aggregate to be limestone, dolomite, slag or other acid soluble material, several pieces that are sufficient to represent the aggregate are taken in the coarse state, ground gently and washed lightly with dilute hydrochloric acid then with water until free from cement and fine aggregate, and are reserved for analysis and determination of specific gravity.

When a concrete contains pebbles or crushed trap rock or other insoluble stone as coarse aggregate, it is necessary to remove this before pulverizing a small sample for the chemical examination, but if the aggregate is acid-soluble such as limestone, dolomite or slag this separation need not be made unless one is to differentiate between the fine and coarse of each kind of material.

In the absence of insoluble coarse aggregate, the whole of the sample, after separation of representative pieces of coarse aggregate, is crushed to ½ in. size or less. In the case of building block and other concrete containing no relatively coarse aggregate, this crushed material is examined under a high power reading lense, wherein particles of crushed stone, slag, etc., may be seen and separated. They should be treated in the same manner as in the qualitative examination of the coarse aggregate. It is by this method that the composition of the ingredients used is obtained and used for purposes of calculation.

Finally a representative sample weighing about 3 ounces is pulverized to pass a 100-mesh sieve and placed in a suitable container.

The schemes of analyses do not deal with the separation of the coarse aggregate by screens. This is well known and it is assumed that the examiner will remove all such coarse aggregate as is possible by known methods. This feature of the work must of necessity be left to the judgment of the operator.

Mixture of Cement and Cinders

One gram of the finely pulverized sample is digested with 50 c.c. of 10% hydrochloric acid until the cement is in solution, after which it is filtered through a Gooch or alundum crucible or a weighed filter paper, washed thoroughly, and dried to constant weight in air bath. The weight obtained multiplied by 100 equals the percentage of insoluble matter. The majority of cinders are 95% insoluble by this treatment and the cement is about 98% soluble. Therefore in practically all cases the percentage of insoluble matter divided by

95 equals the percentage by weight of cinder present.

The filtrate from the insoluble is treated for the removal of silica and the oxide of iron and alumina after which the lime content is determined. Most cements as obtained from warehouses and dealers' stocks contain approximately 61% lime. From the lime of the sample the percentage of cement is then calculated. The small amount of lime obtained from the cinder is negligible and may be disregarded. In any event the error introduced by it favors the fabricator of the concrete as it is calculated to cement.

To determine the production by volume it may be assumed that cinder weighs 40 lb. per cu. ft. in the loose dry state or 50 lb. in the damp loose state. For purposes of accuracy it is better to obtain a piece of the original sample of concrete, dissolve out the cement, wash and dry the cinder, then determine their weight dry and loose as compared to the weight of an equal volume of water from which the weight per cubic foot is obtained.

The proportions by weight are first calculated by dividing the percentage of cinder by the percentage of cement, considering the cement as the unit of measure. The weight per cubic foot of cement (94 lb.) is then divided by the weight per cubic foot of the aggregate. This gives a factor and multiplying the proportion of the aggregate by weight by this factor will give the proportion by volume.

Mixtures of Cement, Sand and Cinder

Treat the one-gram sample the same as in the analysis of the cement cinder mixture up through the determination of insoluble matter and lime. The insoluble matter is then ignited until all carbon is consumed and again weighed. The loss in weight calculated to percentage is the per cent of combustible matter in the sand-cinder mixture.

For the separation of cinder and sand a 100-gram sample of the coarsely crushed ½-in. size material is digested with 10% hydrochloric acid until all cement is removed by solution. The residue consisting of sand and cinder is washed and dried after which the cinder is separated by flotation in a solution of Thoulets reagent, which is made up so that cinder will float but sand will settle in it. This is best made by dissolving 120 grams of mercuric iodide and 100 grams of potassium iodide thoroughly mixed in about 75 c.c. of warm distilled water. The majority of the cinder will float in this medium and may be removed from the surface, washed, thoroughly dried and reserved. The remaining solution is filtered through a paper, taking care not to disturb the settled sand. The filtered solution should be kept for other determinations as it is very expensive. The sand remaining in the dish is washed thoroughly and dried. It is good practice before washing the cinder and sand to boil with dilute hydrochloric acid to remove iodide.

After drying the sand it is spread on a paper and the black particles of heavier cinder are removed with a pair of tweezers. These cinders are added to the main portion after which both aggregates are weighed and their volumes determined. Weights of equal volumes of water are obtained and the weights per cubic foot of the aggregates are then calculated.

As a check the separated cinder may be pulverized and the combustible matter determined. Having determined the combustible matter in the block and in the separated cinders, the percentage of cinders is easily calculated. If the insoluble matter as determined in the one-gram sample was thoroughly dried the check determinations of cinder will be very close.

The calculation to proportions by weight and by volume is the same in all methods.

Mixtures of Cement, Sand and Slag

The slag most commonly used as concrete aggregate is the basic blast furnace slag which is practically 95% soluble in 10% hydrochloric acid, free from unburned carbon and containing about 30% soluble silica. It is rare, indeed, when several pieces cannot be separated from the main sample and determinations of insoluble matter, soluble silica, lime and apparent specific gravity be made.

Determine the loss on ignition of a sample of the concrete.

The insoluble matter is determined in the concrete as in the preceding methods, but it is necessary also to determine the soluble silica by evaporation to complete dryness as well as the lime. Having made these determinations the composition of the block must be calculated as it is impossible to make a mechanical separation of a hardened mixture of cement and slag.

The insoluble matter consists almost wholly of sand and may be considered as such, for although it contains a small amount of insoluble slag and cement, there is of course a slight amount of sand dissolved in the treatment, hence the errors introduced tend to neutralize each other. If the qualitative examination of the slag showed a comparatively high percentage of insoluble matter, this of course must be accounted for in the final calculation. For all practical purposes, however, it is sufficiently accurate to consider the insoluble matter as sand and report it as such.

The sum of the percentages of loss on ignition and insoluble matter subtracted from 100 equals the percentage of cement and slag. The percentage of slag may then be calculated from the percentage of either soluble silica or lime by dividing either constituent of the concrete by the percentage of cement and slag, then using the following equation:

$$X = 100\,\frac{\text{c.c.} - \text{c.m.}}{\text{c.c.} - \text{c.s.}}$$

X = percentage of slag in a 100% mix of cement and slag.

c.c. = Sol. silica or lime in cement.

c.m. = Sol. silica or lime in mixture.

c.s. = Sol. silica or lime in slag.

The percentage of slag and cement in the block may then easily be calculated as also the proportions by weight and volume as in the preceding methods.

Mixtures of Cement, Sand and Limestone

For a mixture of this kind the method is practically the same as in mixtures of cement, sand and slag, merely substituting the percentage lime in the limestone for that in the slag.

A calculation of the limestone content becomes impossible by this method if the mixture contains slag or other ingredients containing a comparatively high percentage of lime. No method has as yet been evolved for the determination of the components of the mixture if it contains other acid soluble material having the same constituents as limestone. The nearest approach to accuracy is by calculation from the percentages of carbon dioxide in the stone and in the mix.

The carbon dioxide is first accurately determined in the mixture, then in the stone. The results of analyses show that hardened concrete contains about 4% carbon dioxide. The approximate limestone content of the mix may then be determined by calculation using the following formula:

$$X = 100\,\frac{\text{CO}_2\text{ in mix} - 4\%}{\text{CO}_2\text{ in limestone}}$$

in which X = the percentage of limestone in the mixture. It must be pointed out, however, that all concretes do not contain 4% carbon dioxide while others exceed this amount, hence large errors may occur from this assumption. Fortunately a concrete containing both slag and limestone is very rare.

Analysis of an Unknown Composition

A very minute visual inspection of the coarsely crushed material is made and the general make-up of the mixture can invariably be discovered by this means. Small pieces of the aggregate are separated, cleaned from adhering cement and sand and are subjected to a quantitative analysis, the results of which are used in subsequent calculations.

One gram of the finely pulverized sample is digested with 50 c.c. of 10% hydrochloric acid and the residue is treated the same as under sand cinder mixtures. The filtrate is evaporated to complete dryness and the soluble silica is

determined by the usual methods. After removal of the soluble silica, the filtrate is analyzed for iron oxide, alumina, lime and magnesia, while the loss on ignition is determined on a new sample. A 100-gram sample is also treated for the removal of cement and any other acid soluble constituents.

Interpretation of Results

The presence of cinder is always confirmed by the physical appearance of the insoluble residue of the coarse sample. Cinder is invariably accompanied by coke or unburned coal which is a certain indication of its presence. The amount present may be determined by separation from the heavier sand, etc., by the use of Thonlet's solution as has been previously described. Sand and crushed trap rock or other insoluble stone may also be seen in this coarse insoluble matter. If both sand and crushed stone are present the percentages of each may be determined either by mechanical separation or by segregating a few representative grains of each, determining the silica content and calculating from the silica content of the mixture of the two.

Soluble silica in excess of 4% is an almost certain indication that slag is present and the relatively high lime content of the mixture is a confirmation of its presence. High lime without any increase in soluble silica is a certain indication of the presence of limestone.

Having determined the chemical composition of the mixture and interpreting the results by it and by visual examination the majority of the components commonly found may be calculated by the foregoing methods.

It is obvious that no set scheme of analysis can be given to cover all materials, hence the analyst must be guided not only by the results of the chemical analysis but by thorough visual inspection and a knowledge of the make-up of concretes in general and of the constitution of the components used in the vicinity from which the sample was obtained.

As previously stated, while we do not claim strict accuracy, we believe the methods outlined above to be a forward movement towards the solution of what has heretofore been considered an impossible undertaking.

Weight of Slurry

A Simple Formula for Calculating the Weights of Slurry With Varying Percentages of Water

By E. Taylor

Cebu Portland Cement Co., Naga, Cebu, P. I.

THE WRITER had occasion to need the weights of cement slurry with varying percentages of water. The following formula was derived which does not involve any actual weighings of different slurries, the only test required being that of the specific gravity of the dry slurry as easily obtained with a pycnometer. With this formula, the weight of a cubic foot of slurry with any desired percentage of water may be promptly and accurately determined.

$$W = \frac{6243\,s}{100 - a + sa}$$

In which

W = weight in lb. of slurry per cu. ft.
s = specific gravity of dry slurry.
a = per cent. water in slurry.

This formula is derived as follows:

In addition to the above symbols, let

v = volume (cu. ft.) of water in 1 cu. ft. slurry.

Then,

$62.43\,s$ = weight (lb.) of 1 cu. ft. of dry slurry
$100\text{-}a$ = per cent. solids in slurry
$1\text{-}v$ = volume (cu. ft.) of solids in 1 cu. ft. of slurry

By proportion,

$$62.43 : 1 :: Wa : v \qquad (1)$$

or

$$v = \frac{Wa}{62.43}$$

Similarly,

$$62.43\,s : 1 :: W(100\text{-}a) : 1\text{-}v \qquad (2)$$

or $W(100\text{-}a) = 62.43\,s - 62.43\,sv$

Substituting for v,

$$W(100\text{-}a) = 62.43\,s - \frac{62.43\,s\,Wa}{62.43} \qquad (3)$$

Whence,

$$W = \frac{62.43\,s}{100 - a + sa} \qquad (4)$$

Multiplying the formula by 100 in order to substitute percentages directly without changing to decimals, we get

$$W = \frac{6243\,s}{100 - a + sa} \qquad (5)$$

"Liming" Mill Water

THE METHOD of adding "lime" to the mill water of the concentrating plant of the Miami Copper Co., Miami, Arizona, is novel and interesting, as described by A. J. McDermid in the *Engineering and Mining Journal*. Liming is necessary because the water contains calcium and magnesium bicarbonates, which would cause decomposition of the xanthate used as a flotation reagent.

Until about three years ago the lime was added in dry form to the ore stream, but this resulted in the insolubles building up on the insides of the pipes and requiring frequent cleaning or replacement of them. Hence it was decided to add the lime as an emulsion to the pond supplying the mill and let the insolubles settle out there. For this purpose a plant was built, consisting of a jaw crusher, 8 ft. by 22 ft. Hardinge mill, Dorr agitating and storage tank, pump and feeder, from which the lime emulsion, containing 16% solids, was discharged into the stream supplying the No. 1 mill pond. This stream was swift enough to assist in diffusing the lime through the water, and the insoluble matter was precipitated to the bottom of the pond. The emulsion enters the pond at some distance from the pump inlet so that the water has approximately 24 hours' treatment before being pumped to the mill. The plant is operated by one man on day shift only and consumes about 16 tons of lime rock (?) per day. Enough lime is added to give a phenolphthalein alkalinity equivalent to 0.25 to 0.35 lb. of free calcium oxide per ton of water, which is necessary to neutralize the acidity of the ore.

This new method of adding lime has been satisfactory, but the insoluble material deposited over this three-year period filled up the pond to such an extent that it was necessary to devise some method of dredging it out. This has been accomplished by installing a dragline scraper, which carries this sludge up over a steel plate at one end of the pond and dumps it into a sump where it is agitated with compressed air and pumped to the tailings stream by a 6-in. Krogh suction dredge pump driven by a 75-hp. General Electric motor. The scraper, which was built in the company shops, is 3 ft. wide by 20 in. high by 7 ft. long, with a rounded back and a 4½-ft. open bottom. It is of No. 10 gage steel with reinforcing bars and is perforated on top with ⅝-in. holes to allow the water to be forced out by the sludge. A series of holes on the bales permits adjusting the position of the dragline so that it will cut deeper or shallower as desired.

In some depths of water it was found that better results are obtained when the scraper is inverted so that the top is open and the bottom covered. The scraper is operated by a Sullivan double-drum 25-hp. electric hoist, with ½-in. cables on both drums, and with the tail sheave arranged so that it may be clamped to any point on an anchor cable running across the other end of the pond and supported on two rafts.

Attention, Twenty-Third Engineers!

THE Metropolitan New York Society of Twenty-third Engineers is trying to get in touch with all the men who served in that engineer regiment during the war, and would greatly appreciate having all such send in their names and addresses to Doane Eaton, 50 Morningside Drive, New York.

Manufacturers' Division of National Crushed Stone Association Meets in New York

THE REGULAR ANNUAL meeting of the Manufacturers' Division of the National Crushed Stone Association was held at the Pennsylvania hotel, New York City, October 24. As usual the local arrangements were made by Gordon Buchanan, president of the C. G. Buchanan Co.

After the dinner, Chariman H. W. Davison made a happy introductory address and then introduced W. F. Wise, president of the National Crushed Stone Association, who extended a welcome and appreciation to and of the Manufacturers' Division. He urged that the active members send their superintendent to the conventions and that the manufacturers send their technical men for the mutual advantage of both and the good of the industry.

Chairman Davison then called upon the past presidents who were guests at the meeting.

John Rice spoke first and reviewed the past history of the association, with pleasantries based on recollections of a most faithful attendance at all conventions.

O. M. Graves spoke next in his usual interesting and inspiring way. He then introduced B. A. McKinney, president of the newest local association in the National Crushed Stone Association, the New England Crushed Stone Association. Mr. McKinney told something of the work and problems of this organization.

E. J. Krause, V. P. Ahearn, A. T. Goldbeck, A. L. Worthen, W. M. Andrews and W. L. Sporborg all spoke briefly in the sequence given.

The last speaker on the program was J. R. Boyd, secretary, who told something about the arrangements for exhibits at the coming convention at St. Louis, saying that full details would be given in the convention issue of the association's *Bulletin*, which would be mailed out soon. He said a special train would be made up at Boston and stop at New Haven, Philadelphia and Pittsburgh, and he urged every one to make use of this train en route to St. Louis. He also told of a special list of operating men of member companies he is compiling for distribution to associate members.

Registration

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.—Irving K. Cox, T. E. Fisher, W. C. MacEwen.
American Manganese Steel Co., Chicago Heights, Ill.—W. M. Black.
American Steel and Wire Co., Chicago, Ill.—D. J. Henecker.
Atlas Powder Co., Wilmington, Del.—A. D. Hammond.
Earle C. Bacon, Inc., New York, N. Y.—S. F. Macpeak, W. H. Milroy, J. W. Morrissey, T. J. Morrissey, W. V. Pietsch.
C. G. Buchanan Co., New York, N. Y.—Gordon Buchanan, G. W. Flounders.
Bucyrus-Erie Co., South Milwaukee, Wis.—J. C. Alexander, J. W. Fawcett, E. G. Lewis.
Burton Explosives, Inc., Cleveland, Ohio.—W. O. Dunn.
Cross Engineering Co., Carbondale, Penn.—W. S. Nicol.
Crucible Steel Co., New York, N. Y.—R. W. Persons.
E. I. DuPont de Nemours & Co., Wilmington, Del.—P. J. Kimball, E. I. Wolf.
General Electric Co., Schenectady, N. Y.—D. L. Chesnut.
Gill Rock Drill Co., Lebanon, Penn.—F. A. Gill.
Harnischfeger Sales Corp., Milwaukee, Wis.—T. A. Burns, H. W. Davison, A. F. Gaum, P. H. McGredy.
The Hayward Company, New York, N. Y.—H. C. Ryder.
Hendrick Manufacturing Co., Carbondale, Penn.—B. G. Dann, B. G. Shotton.
Hercules Powder Co., Wilmington, Del.—J. Barab, M. R. Budd, J. H. Horlick.
Ingersoll-Rand Co., New York, N. Y.—A. A. Holland.
Keystone Lubricating Co., Philadelphia, Penn.—A. T. Lowry, R. Robinson.
Linn Manufacturing Corp., Morris, N. Y.—R. A. Bowler, M. N. Bridges.
Loomis Machine Co., Tiffin, Ohio—E. E. Winship.
Marion Steam Shovel Co., Marion, Ohio—J. B. Crew, R. L. Johnson, R. P. Sullivan, W. N. Westland.
National Equipment Corp., Milwaukee, Wis.—J. McElvoy.
Niagara Screen Co., Buffalo, N. Y.—S. C. Hodge.
Nordberg Manufacturing Co., Milwaukee, Wis.—L. D. Hudson, Sr., L. D. Hudson, Jr.
Pit and Quarry, Chicago, Ill.—E. M. Buck.
Robins Conveying Belt Co., Chicago, Ill.—J. H. Robins.
ROCK PRODUCTS, Chicago, Ill.—F. S. Peters, R. C. Sullivan, C. L. Walker.
Ross Screen and Feeder Co., New York, N. Y.—E. Webster.
Sanderson Cyclone Drill Co., Orrville, Ohio—H. F. Nothacker.
Stephens-Adamson Manufacturing Co., Aurora, Ill.—F. S. Wells.
Taylor Wharton Iron and Steel Co., High Bridge, N. J.—C. B. Andrews, J. C. Taylor.
Thew Shovel Co., Lorain, Ohio—M. S. Cheney, T. F. Henson, R. Savage.
Traylor Engineering and Manufacturing Co., Allentown, Penn.—D. A. Cheyette, R. R. Shafter.
W. S. Tyler Co., Cleveland, Ohio—Albert E. Reed, N. O. Weil.
Vulcan Iron Works, Wilkes-Barre, Penn.—Thomas MacLachlan.
Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn.—B. Lester.

Member Guests

W. F. Wise, president, N. C. S. A., Southwest Stone Co., Dallas, Tex.
V. P. Ahearn, National Sand and Gravel Association, Washington, D. C.
W. M. Andrews, Lake Erie Limestone Co., Youngstown, Ohio.
H. E. Bair, The France Stone Co., Toledo, Ohio.
J. R. Boyd, National Crushed Stone Association, Washington, D. C.
F. H. Edwards, Connecticut Quarries Co., Inc., New Haven, Conn.
A. T. Goldbeck, National Crushed Stone Association, Washington, D. C.
O. M. Graves, General Crushed Stone Co., Easton, Penn.
F. T. Gucker, John T. Dyer Quarry Co., Norristown, Penn.
F. S. Jones, General Crushed Stone Co., Easton, Penn.
E. J. Krause, Columbia Quarry Co., St. Louis, Mo.
B. A. McKinney, West Roxbury Trap Rock Co., West Roxbury, Mass.
R. Moore, General Crushed Stone Co., Easton, Penn.
John Rice, General Crushed Stone Co., Easton, Penn.
John Rice, Jr., General Crushed Stone Co., Easton, Penn.
F. W. Schmidt, North Jersey Quarry Co., Morristown, N. J.
John H. Schmidt, North Jersey Quarry Co., Morristown, N. J.
W. L. Sporborg, General Crushed Stone Co., Easton, Penn.
A. L. Worthen, Connecticut Quarries Co., Inc., New Haven, Conn.
I. W. Wortman, North Jersey Quarry Co., Morristown, N. J.

South Dakota State Cement Plant Reports Low Stocks

THE SOUTH DAKOTA state cement plant probably will not have to shut down except for the annual repair work, in December, it was indicated by officials at the plant. Bins practically are empty, and the shutdown depends on orders coming in and weather conditions. The shutdown last year lasted only three weeks.—*Sioux City* (Ia.) *Journal.*

Iowa Gravel Company Moving Site of Operation

THE CONCRETE MATERIAL CORP., James Galyean, manager, which has been operating the big gravel pit a couple miles northwest of Clarksville, Iowa, has closed down and the works will be dismantled and the machinery, etc., moved to Wallingford, a small town about six miles south of Estherville, where a big gravel plant will be operated early in the spring of next year. A number of the workmen who have been with the company here at Clarksville will go with the outfit to the new location. This last company has operated the plant in this vicinity for the past three years nearly, and more than 15,000 cars of cleaned and graded road, etc., material have been shipped out. During the latter days of the operation the material was prepared and stacked in long ricks and will be shipped out later. It is estimated that more than 2000 carloads of the material are awaiting shipment. One power dragline will be left here to load the unshipped material as directed.

Waugh and Tackman, bridge contractors of this place, are already on the site of the new location building the foundations and other cement concrete for the new plant.—*Clarksville* (Iowa) *Star.*

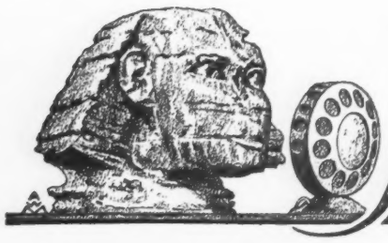
New Limestone Operation for Western Pennsylvania

A REVIVAL of interest in the county's natural resources was evidenced with announcement that a new limestone quarry located in an area of 80 acres in Shenango township, Pennsylvania, will shortly be operated by a maximum force of men. Initial operations have already begun with a small force.

The quarry location is ideal for industrial purposes, it is said. It is situated on the John Black farm, near McKee school, two miles from East New Castle, in Shenango township. The acres were at one time the property of Charles Hood of East Brook road who sold them to Mr. Black. E. J. O'Brien obtained a lease on the property and sub-leased it to Charles Price of Shenango. Mr. Price is directing the quarry work.

Mr. O'Brien said samples of the limestone have been tested and approved by the State Highway Department for use in construction of highways and other state projects. In addition the quarry will produce stone which will be crushed for agricultural and cement purposes. Mr. O'Brien said the group sponsoring the quarry will also produce burnt and pulverized lime.

The deposits are said to be 20 ft. and it is said by Mr. O'Brien that other minerals will probably be found. At present men are beginning work in blasting and quarrying. About $15,000 in machinery has been assembled. This includes a 40-hp. gas engine which is used to operate the crusher.—*Newcastle* (Penn.) *News.*



Hints and Helps for Superintendents

Portable Screen for Cleaning Stone

A VERY SIMPLE and effective method of cleaning stone or screening any material as it is loaded by a shovel and before going to the crushing plant by truck or car is shown in the accompanying photograph.

The particular installation shown is used in an Ohio quarry to clean the top layer of stone before loading it to railroad cars and without putting it through the crushing plant in the regular way. This top layer is thinly stratified and of a different composition from the rest of the stone and is easily excavated by a small steam shovel, so that the scheme shown works out very well for cleaning and loading this stone separately.

The open end revolving screen is mounted on a frame with wheels and is hooked up to the shovel by wire cable so that it is pulled along with it. The screen frame is made high enough to allow a truck to load under the end of the screen, and a short belt conveyor below the body of the screen carries the fines out of the way.

The screen is motor driven and has a push button control switch located at the discharge end, so that it may be easily started or stopped at will in loading the truck. The shovel dumps directly into the feed hopper of the screen, which is revolved only while the truck is being loaded. In this way the stone is very effectively and easily cleaned as it goes to the trucks.

Unique portable revolving screen for cleaning stone or screening material as it is loaded by shovel

These sheep are efficient weed cutters at a Wisconsin quarry operation

Old-Style Weed Cutters Adapted to Quarry Use

NO, Mr. Quarryman, the accompanying illustration is not supposed to be a beautiful pastoral scene taken on an editor's vacation. It is actually a view right at an operating quarry, and shows some of the automatic weed-cutters in operation at the property of the Mayville White Lime Works, near Mayville, Wis. This company maintains a flock of about 65 black-faced sheep at its plant and allows them to run loose during the day over the whole property. Since the quarry is in a bluff above the plant, the sheep have easy access to the quarry floor as well as to the upper portions around the quarry rim. The whole property is thus kept entirely clear of weeds and high grass by the sheep, making the stripping operation at least much easier. In addition, the company reaps some profit each year from its stock raising activities. (This company also keeps its unopened ground planted with alfalfa and each year has a good crop of hay, too.)

It is surprising that the sheep are not a nuisance around the quarry, but it is reported that they are not. The operation is with an electric railway system, but the sheep seldom get in the way.

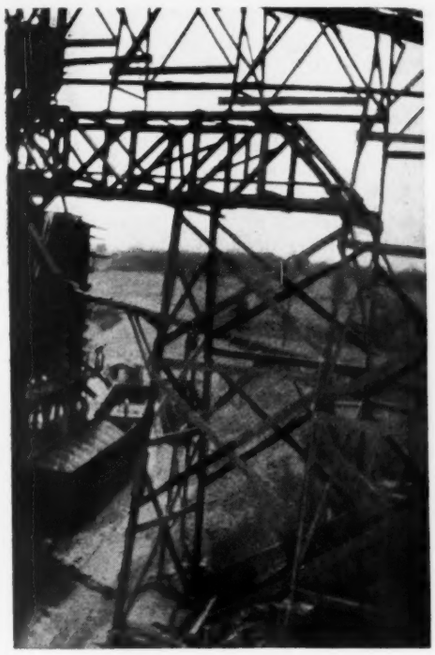
Carrying the Plant Conveyor Over a Double-Track Siding

IT IS SELDOM that the main conveyor to the top of a crushing plant or sand washer is supported by any other means than by the common wood or steel bents, regularly spaced. By this method it is practical to carry the conveyor directly over the railroad loading track, if this is necessary, since the first bent can be spaced slightly further away from the plant structure so as to allow sufficient clearance for the track. However, a different problem was encountered at the Burlington, Wis., sand plant of the North Shore Material Co., and it was solved in an unusual manner.

The original pit at this operation was at one end of the plant so that the main conveyor to the washers was carried up in the

usual way. It was decided to open up a new pit at the side of the plant, and to reach this pit the conveyor had to pass over the loading track and also over a storage track immediately beside the loading track.

The conveyor could have been carried on bents by placing one directly between the two tracks, but obviously this would have been inconvenient to men working around the cars, and moreover would have been a constant source of danger. It was decided then that there should be a clear span over both tracks and the most simple expedient to obtain this was a truss over the tracks, supporting the conveyor framework above. Consequently a Pratt truss, constructed of timbers, was fabricated and put into place, with one end supported on the upper floor



A truss, constructed of timbers, is used to support the conveyor

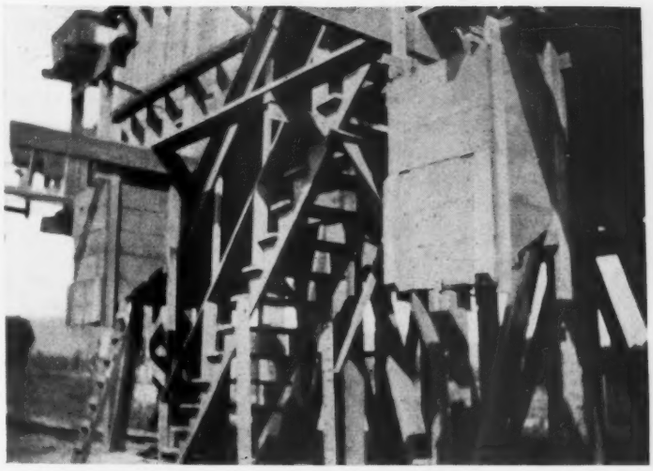
of the washing plant and the other supported by two bents at the far side of the railroad tracks. The use of two bents at the outer end insured rigidity to the structure, although one bent, of course, could carry the load. With this truss in position it was a simple matter to carry the conveyor above it by means of small bents.

Homemade Batching Bins for the Gravel Plant

WHEN A GRAVEL PLANT has some orders for batched material, but not enough to warrant the installation of a regular batching bin, a substitute arrangement can be installed readily. At the plant of the Prairie Sand and Gravel Co., Prairie du Chien, Wis., two hoppers have been installed on the trucking side of the plant. One of these is designed to hold exactly 10 cu. ft., while the other is just twice as large. This arrangement gives the exact 1:2:3 mix when a sack of cement is added to the sand and gravel.

The hoppers are of the simplest construction, being merely wooden boxes with bottoms which slant downward away from the plant at an angle of about 45 deg. With this simple shape the volume can be readily computed, so that the dimensions for the boxes can be determined before the carpenter starts to work. The gate for each bin is not in the bottom, but at the lower edge of the front face. This has a tendency to throw the material outward and well into the truck body. Each gate is fastened by a hook attached to a block on the under side of the hopper. A piece of trap iron with a hook bent at one end can be readily used for this catch, if a hole is bored in the center and it is pivoted to the block through the hole.

A braced framework holds each box out from the side of the plant, and there are no underposts to get in the way when a truck is backed in. A small platform between the two hoppers provides a place for a man to stand while filling the hoppers. The hoppers are filled directly from the plant bins by chutes provided with the usual gates.



Home-made batching bins which supply a regular 1:2:3 mix for concrete

One Way of Moving Stripping, Sand or Gravel

THE ACCOMPANYING VIEW shows how a firm of contractors, Tyler and Baker, Cheyenne, Wyo., moved about 1800 tons of sand and gravel from pit to plant in 20 days. The tractor is a Caterpillar 60, equipped with a master rotary scraper. Stripping could possibly be handled in this way in small operations, where more than one dump can be provided, but obviously 90 tons of material a day is a small output for a commercial gravel plant.

Old Box Car Body Used as a Garage

IT IS NOT unusual to see old abandoned box car bodies in use as sheds, plant shops and even offices around rock products plants,

Garage made from old box car body

but there is still another use that is seldom seen. If one end of the body is cut out and doors hung in the opening a very good garage can be made for tractors and small trucks. Two cars, end to end, will have plenty of room in such a garage.

Tractor used for moving sand and gravel from pit

Changes Due in Building Construction Industry

THE BUILDING industry if it is to prosper must keep pace with the general advance in business thought and practice, declares F. S. Laurence, executive secretary of the Producers' Council, in a statement made public by the American Institute of Architects, with which the council is affiliated.

"Taking the customer's point of view" is the general principle of action for which the council stands in everything—production, sales promotion, advertising, contact with the architectural profession and service to the public, according to Mr. Laurence. The council is composed of 60 companies and associations of manufacturers in the field of building materials and appliances with a combined capital of $22,500,000,000.

The nation looks to the architect for leadership in the great era of construction which is to come, asserts Mr. Laurence, pointing out that vast changes impend in the industry.

"These changes," he says, "do not consist simply in new methods of construction which have grown up nor in changes in architectural design brought about by these and by the development of our zoning laws.

"Business thought, business conceptions, business ethics and business methods have all marched forward tremendously in the past 20 years. The construction industry is a part, and an important part, of the general business fabric, and its thought, its conceptions, its ethics and its methods must keep abreast with this general progress, if the industry itself and individual units in the industry are to prosper equally.

"If one thing stands out more than another these days in the sphere of large business generally it is the discarding of worn out ideas and the replacing of them with new and even revolutionary conceptions of policy and method.

"I will not say that Henry Ford began it all when he sprung on an astonished business world the doctrine that higher wages to labor meant more business and more profit for everybody, through the increased purchasing power conferred on labor, but that marks about the time when big business began to come out of some time-worn fallacies in economic thought.

"Ford may have had in mind only the sale of Fords as likely to be increased, but I imagine the clothing industry, the boot and shoe industry, the silk industry and even the fur industry felt the benefit of it. And I do not except the building industry. Home builling certainly was stimulated by it.

"Similarly, the doctrine 'let the public in on the profit' gained force. In other words, as you make your cleanup reduce the cost to the consumer—before competition does it for you. Keep ahead of competition.

"Heretofore the practice has been to find out if we could, by guess work, what the customer wanted and then we would determine whether we would give it to him. If it wasn't what we ourselves wanted to do we simply put a little more high pressure salesmanship on and gave him what we wanted him to take. And under that time honored doctrine many a salesman has been 'canned' for taking too much the customer's point.

"Today, enlightened employers in big business are going to considerable pains to find out and to respect the customer's point of view in their production and methods of advertising, selling and rendering service."

Gold Economy

WHILE OUTSIDE our ROCK PRODUCTS field, strictly interpreted, the following article, by Thomas F. Woodlock, reprinted from the *Wall Street Journal,* New York City, is tremendously interesting to all who are trying to grasp a comprehension of economics. It presents the "gold economist's" point of view so clearly that even the novice in economics may get the point, and until we do, we do not grasp the significance of the changes now in progress in the business world. The article, in full, follows:

Gold production of the world this year is in round figures enough to make $405,000,000. Estimate of the world's production in 1940 by the Gold Delegation of the Financial Committee of the League of Nations is that it will equal $314,000,000. Joseph Kitchin, described in the delegation's report as "a recognized authority on precious metal statistics," estimates the 1940 yield at $370,000,000. A round-number "split" between the two gives, say, $350,000,000. The delegation reckons that from $180,000,000 to $200,000,000 flows every year in Oriental countries and into industrial arts, leaving a little more than half the annual supply for use as "money."

At the end of 1928 countries which use gold as "money" held in round figures "gold reserves" of $10,035,000,000, and the aggregate of currency obligations resting upon these reserves was about $25,000,000,000, so that the reserve gold "cover" was about 40%.

Assuming that commodity prices *in general* depend upon the total amount of "credit" (which is limited by the volume of currency) in existence and its relation to the volume of "business" (i.e., exchanges of commodities and services) transacted, the annual additions to the gold reserves of the world become of extreme importance. The average annual rate of increase in the "business" of the gold-using countries is estimated at a minimum of 2%, with 3% a more probable figure. Assuming the latter figure and assuming that a 40% "cover" reserve" will be required, the "deficit" of gold for monetary use on the most optimistic estimates of production (Mr. Kitchin's) is $79,000,000 in 1930, rising in 1940 to $238,000,000. On the basis of the "round number split" of $350,000,000 the "deficit" in 1940 would be $258,000,000.

This might be diminished as a result of any or all of these things:

1. An unforeseen increase in production from new sources;
2. A diminution of the non-monetary demand;
3. A lower reserve rate.

If not so diminished, the conclusion that commodity prices are destined to decline in a large and permanent way is definitely suggested.

The delegation is frankly skeptical as to new sources of gold and it has no reliable ground for assuming that non-monetary demands will grow less as the years go by. Relief is therefore to be looked for mainly in increasing the credit—efficiency of the gold in central banks' reserves. Such an increase might come in two ways. Distribution of reserves might be so handled that no large portion of the whole would rest idle in any one center when there was use for it elsewhere. But the main hope is that the world can be educated to do its credit business on a smaller reserve-ratio. If instead of 40%, business could be done on a ratio of 33%, the deficits above referred to, of $238,000,000 and $258,000,000 in 1940, would be reduced to $170,000,000 and $190,000,000, respectively. And on assumption of an annual rate of increase in business of but 2%, the 1940 deficit would be $34,000,000 and $54,000,000, respectively, according as Mr. Kitchin's figure or the "round-number split" figure be taken. The 33% ratio in fact is about the *average* of present *legal* currency reserve requirements, but the present *aggregate* surplus over this ratio—and more—is concentrated in a few central banks, and this country alone holds five-sixths of this "legal" surplus.

Present distribution of gold reserves is thus unequal and to that extent tends to sterilize in part their total efficiency. But the real question is as to what the delegation calls the "conventional cover ratio"—can it be reduced? Can the world be induced to accept, say, 25% as a minimum legal reserve in place of 33%?

Here we touch something very elemental.

It is a fair statement to say that the degree to which a nation may be said to be "civilized" is measured by the gold reserve ratio on which it habitually does business, and by the ratio that the "cash" reserves of its commercial banks bear to their liabilities. If this be true, the hope of the delegation that lower gold reserve ratios may be possible in the future is equivalent to a hope that the world will grow in mutual understanding and mutual confidence, so that the people will trust each other to a larger extent than heretofore. In that hope all can join, especially as, in the language of the theologian, the world's gold reserves and the world's bank cash reserves are a very fair yardstick with which to measure the average consequences of original sin, so far as the world's business is concerned—subject to correction for the factor of the world's average intelligence, informed by experience.

Editorial Comment

OUR PLATFORM

¶ Greater Economy of Production; the Best in Machinery, Control Equipment; High Wages; Perfect Co-ordination. ¶ Comprehensive Organization of Industry for Research, Promotion. ¶ Retirement of the State from Competition with Private Business. ¶ Active Participation of Business Men in the Business of Government. ¶ The Promotion of Safety and Welfare of the Industry's Employes.

Are You Black or White?

Numerous publicists and editorial writers are much concerned about the present hesitation of business leaders, and their alleged lack of courage of leadership. It seems to us that the hesitation can be easily accounted for, and that the lack of courage may not be real or at least it may be merely momentary. There are developing, apparently, two entirely different and distinct schools of thought in business economics, or business philosophy; and they are as far apart right now as black and white, or the poles of the earth. One school, composed apparently of nearly all the prominent bankers of New York (and a few in other places) believes in "gold economy"; the other school, in which industrialists like Ford, Schwab, Raskob, are outstanding examples, believes in the "new economy."

Briefly, the gold economists believe that the amount of gold reserve in the banks of the world is the measure of all the rest of the world's wealth; that when the production of wealth in other forms (and the volume of business transactions in general) exceeds something over twice the value of this gold, we have an inflation of credit and values generally. Then comes the time when these prices, values and credits must be deflated, or readjusted. For while a large volume of the world's business is done on credit, or on vehicles of credit, like paper money, in the end all these have to be referred back to the actual stock of gold in the world's treasuries.

The deflationists believe that while the values of stocks, bonds, and at least some basic commodities have been deflated, or are now being deflated, it yet remains to deflate wages, salaries, and the standard of living. In their system of economy eventually everyone gets back where they were because less money, or credit, buys proportionately more, or in other words money is worth more, measured in terms of other forms of wealth, commodities, etc. This is the inevitable result of a gold standard and the failure to increase the world's stocks of gold in the same proportion that other forms of wealth are created.

The new school of economists believes that the future prosperity of this country, and of the civilized world, depends on the maintenance of high wages, still higher wages eventually, and a continuance of high standards of living for the common man, and still higher standards to come. In other words the buying power of everybody must be maintained and increased. Most American producers and industrialists undoubtedly have recently become and still are believers in this system of economy, and they have resisted and will resist cost reductions through wage cuts. They probably feel that any increase in the value of money, with the maintenance of present wage scales, will be a boon to industry; and they also feel probably that in some way or other the stock of a comparatively useless metal like gold should not be allowed to cause periodical business upsets—they seek stability.

It is obvious that if one is a confirmed deflationist he will hold out for the deflation of wages, which so far has not been noticeable. He believes that while prices are low today, they will be lower still before they are higher. Unfortunately, it seems to us, the bankers who cling the most tenaciously to this deflation theory are very powerful in industry, although in many instances very far removed from close and intimate contact with it, except such contact as they can get from a perusal of balance sheets. At least they have not the human contacts with the men of industry who create the wealth these bankers traffic in.

So this business depression, if there really exists a depression, is different from all others in history. Previously, every one accepted the deflation theory and waited for the deflation to be complete. But now with such notable exponents of the new economy of high wages, increased purchasing power, etc., as Henry Ford, all of us no longer accept the deflation method as the only possible solution of our troubles.

If the producer is to be a deflationist he will look forward to reducing his costs by the easiest route—wage cuts. If he is not a deflationist he will do his best to cut costs by every possible economy from better management and better equipment. He will expect profits from such economies and a possible slight increase in price—but he will not look farther for profits from lower prices and lower wage scales.

The deflationist would set us back a few years to start over again a process of new inflation. The new economists would start now to do business sanely and prosperously, on the theory that greater buying power, not deflation of their hard-earned wealth, is what our people need. And the hard-earned wealth may be real estate, stocks, bonds, or merely years of training and experience in industry and production.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. 1st 6's[29]	11- 5-30	94	.....	
Alpha P. C. new com.	11- 1-30	21⅝	.....	50c qu. Oct. 25
Alpha P. C. pfd.[2]	10-31-30	118	.....	1.75 qu. Mar. 15
American Aggregates com.	11- 5-30	14	16	75c qu. Mar. 1
Am. Aggr. 6's, bonds	11- 3-30	.....	75	
American Brick Co., sand-lime brick	10- 6-30	4½	.....	25c qu. Feb. 1
American Brick Co. pfd.	11- 3-30	.....	57	50c qu. May 1
Am. L. & S. 1st 7's[29]	11- 5-30	97	.....	
American Silica Corp. 6½'s[49]	11- 5-30	No market		
Arundel Corp. new com.	11- 3-30	39¼	.....	75c qu. Oct. 1
Atlantic Gyp. Prod. (1st 6's & 10 sh. com.)[10]	11- 5-30	No market		
Beaver P. C. 1st 7's[20]	10-30-30	95	98	
Bessemer L. & C. Class A[4]	10-31-30	.....	28¼	75c qu. Nov. 1
Bessemer L. & C. 1st 6½'s[4]	10-31-30	90	94	
Bloomington Limestone 6's[29]	11- 5-30	53	56	
Boston S. & G. new com.[47]	10-31-30	16	20	40c qu. Oct. 1
Boston S. & G. new 7% pfd.[47]	10-31-30	46	50	87½c qu. Oct. 1
California Art Tile A	10-31-30	.....	8	43¾c qu. Mar. 31
California Art Tile B[50]	10-30-30	.....	4	20c qu. Mar. 31
Calaveras Cement com.	10-31-30	.....	12	
Calaveras Cement 7% pfd.	10-31-30	.....	85	1.75 qu. Oct. 15
Canada Cement com.	11- 3-30	.....	15	
Canada Cement pfd.	11- 3-30	90	91	1.62½ qu. Sept. 30
Canada Cement 5½'s[43]	10-31-30	99½	100½	
Canada Cr. St. Corp. bonds[43]	10-31-30	94	97	
Certainteed Prod. com.	11- 3-30	4¼	5	
Certainteed Prod. pfd.	11- 3-30	19	20	1.75 qu. Jan. 1
Cleveland Quarries	11- 3-30	60	70	75c qu. 25c ex. Dec. 1
Columbia S. & G. pfd.	11- 3-30	85	95	
Consol. Cement 1st 6½'s, A	11- 5-30	70	80	
Consol. Cement. 6½% notes	11- 5-30	60	65	
Consol. Cement pfd.[29]	11- 5-30	50	60	
Consol. Oka S. & G. 6¼'s[12] (Canada)	10-31-30	99	101	
Consol. Rock Prod. com.[9]	10-30-30	1	2	
Consol. Rock Prod. pfd.[9]	10-30-30	9	11	43¾c qu. June 1
Consol. Rock Prod. units	11 -3-30	10	15	
Consol. S. & G. pfd. (Can.)[45]	10-31-30	.....	84	1.75 qu. Nov. 15
Construction Mat. com.	11- 3-30	12	13	
Construction Mat. pfd.	11- 3-30	33¼	35½	87½c qu. Nov. 1
Consumers Rock & Gravel, 1st Mtg. 6's, 1948[18]	10-30-30	87	93	
Coosa P. C. 1st 6's[29]	10-21-30	50	55	
Coplay Cem. Mfg. 1st 6's[40]	10-31-30	95	.....	
Coplay Cem. Mfg. com.[40]	10-31-30	10	.....	
Coplay Cem. Mfg. pfd.[40]	10-31-30	60	.....	
Dewey P. C. 6's (1930)[30]	11- 5-30	99	.....	
Dewey P. C. 6's (1931-37)[30]	11- 5-30	99	.....	
Dolese & Shepard	11- 3-30	73	77	$2 qu. Oct. 1
Dufferin Pav. & Cr. Stone com.	10-20-30	.....	15	
Dufferin Pav. & Cr. Stone pfd.	11- 3-30	83	.....	1.75 qu. Oct. 1
Edison P. C. com.[39]	10-31-30	50c	.....	
Edison P. C. pfd.[39]	10-31-30	2½	.....	
Giant P. C. com.[2]	11- 1-30	3	8	
Giant P. C. pfd.[2]	11- 1-30	20	28	1.75 s.-a. June 16
Gyp. Lime & Alabastine, Ltd.	11- 3-30	13¾	14	37½c qu. Oct. 1
Hermitage Cement com.[11]	11- 1-30	30	40	
Hermitage Cement pfd.[11]	11- 1-30	86	92	
Ideal Cement, new com.	11- 5-30	50	55	75c qu. Oct. 1
Ideal Cement 5's, 1943[33]	11- 1-30	99	101	
Indiana Limestone units[20]	11- 5-30	.....	80	
Indiana Limestone 6's	11- 1-30	60	62	
International Cem. com.	11- 5-30	57½	59	$1 qu. Sept. 30
International Cem. bonds 5's	11- 3-30	95	95¼	Semi-ann. int.
Iron City S. & G. bonds 6's[46]	11- 1-30	90	93	
Kelley Is. L. & T. new stock	11- 3-30	36	40	62½c qu. Oct. 1
Ky. Cons. St. com. V.T.C.[48]	10-30-30	8½	10	
Ky. Cons. Stone 6½'s[48]	10-30-30	90	100	
Ky. Cons. Stone pfd.[48]	10-30-30	85	90	1.75 qu. Nov. 1
Ky. Cons. Stone com.[48]	10-30-30	8½	10	
Ky. Rock Asphalt com.[11]	11- 1-30	11	13	40c qu. Oct. 1
Ky. Rock Asphalt pfd.[11]	11- 1-30	77	80	1.75 qu. Sept. 1
Ky. Rock Asphalt 6½'s[11]	11- 1-30	90	100	
Lawrence P. C.	10-31-30	57	61	$1 qu. Sept. 30
Lawrence P. C. 5½'s, 1942[2]	10-31-30	86½	89	
Lehigh P. C.	11- 3-30	15¾	17	25c qu. Nov. 1
Lehigh P. C. pfd.	11- 3-30	99½	103½	1¾% qu. Oct. 1
Louisville Cement[48]	11- 3-30	225	250	
Lyman-Richey 1st 6's, 1932[13]	10-31-30	97½	99½	
Lyman-Richey 1st 6's, 1935[13]	10-31-30	96½	99½	
Marblehead Lime 6's[14]	10-31-30	85	90	
Marbelite Corp. com. (cement products)	10-16-30	100	.....	
Marbelite Corp. pfd.	9-20-30	12	.....	50c qu. Oct. 10
Material Service Corp.	11- 5-30	17	19	50c qu. Sept. 1
McCrady-Rogers 7% pfd.[22]	10-30-30	50	55	
McCrady-Rogers com.[22]	10-30-30	15	20	
Medusa Portland Cement	11- 3-30	.....	90	1.50 Oct. 1
Mich. L. & C. com.[6]	11- 1-30	25	.....	
Missouri P. C.	11- 5-30	30	31	50c qu. & 50c ex. Nov. 1
Monolith Portland Midwest[9]	10-30-30	2½	3	
Monolith bonds, 6's[9]	10-30-30	80	85	
Monolith P. C. com.[9]	10-30-30	4½	5½	40c s.-a. Jan. 1
Monolith P. C. pfd.[9]	10-30-30	3½	4½	40c s.-a. Jan. 1
Monolith P. C. units[9]	10-30-30	12½	14	
National Cem. (Can.) 1st 7's[42]	10-31-30	99½	100	
National Gypsum A com.	11- 3-30	4½	5½	
National Gypsum pfd.	11- 3-30	25	28	
Nazareth Cement com.[26]	11- 3-30	17	.....	
Nazareth Cement pfd.[26]	11- 3-30	97	.....	
Newaygo P. C. 1st 6½'s[29]	11- 5-30	100½	.....	
New Eng. Lime 1st 6's[14]	10-31-30	50	60	
N. Y. Trap Rock 1st 6's	11- 3-30	101¾	102	
N. Y. Trap Rock 7% pfd.[36]	10-24-30	95	.....	1.75 qu. Oct. 1
North Amer. Cem. 1st 6½'s	11- 3-30	55½	.....	
North Amer. Cem. com.[29]	11- 5-30	4	6	
North Amer. Cem. 7% pfd.[29]	11- 5-30	17	21	
North Shore Mat. 1st 5's[15]	11- 5-30	95	.....	
Northwestern States P. C.[37]	11- 1-30	110	120	$2 Apr. 1
Ohio River Sand com.	11- 3-30	.....	15	
Ohio River Sand 7% pfd.	11- 3-30	.....	97	
Ohio River S. & G. 6's[16]	10-31-30	85	90	
Oregon P. C. com.[20]	10-30-30	9	10	
Oregon P. C. pfd.[20]	10-30-30	80	83	
Oregon P. C. conv. pfd.	10-30-30	90	92	
Pacific Coast Aggr. com.[50]	10-30-30	2½	.....	
Pacific Coast Aggregates pfd.	11- 3-30	3	6	
Pacific Coast Cement 6's[5]	10-30-30	75¾	76¼	
Pacific P. C. com.	10-31-30	14	17	
Pacific P. C., new pfd.	10-31-30	65	75	1.62½ qu. Oct. 4
Pacific P. C. 6's[5]	10-30-30	98¾	.....	
Peerless Cement com.[21]	11- 1-30	6½	8	
Peerless Cement pfd.[21]	11- 1-30	70	80	1.75 Oct. 1
Penn.-Dixie Cement pfd.	11- 3-30	28	30	
Penn.-Dixie Cement com.	11- 3-30	4	4⅝	
Penn.-Dixie Cement 6's	11- 3-30	75½	76½	
Penn. Glass Sand Corp. 6's	10- 8-30	102½	103¼	
Penn. Glass Sand pfd.	10- 8-30	103½	.....	1.75 qu. Oct. 1
Petoskey P. C.	11- 5-30	6	6½	15c qu. Apr. 1
Port Stockton Cem. com.[20]	10-30-30	No market		
Riverside Cement com.	10-31-30	.....	14	
Riverside Cement pfd.[20]	10-30-30	72	75	1.50 qu. Nov. 1
Riverside Cement, A[20]	10-30-30	12	15	31¼c qu. Nov. 1
Riverside Cement, B[20]	10-30-30	2	.....	
Roquemore Gravel 6½'s[17]	10-31-30	98	100	
Santa Cruz P. C. 1st 6's, 1945[5]	10-30-30	104½	.....	6% annually
Santa Cruz P. C. com.[5]	10-30-30	90	.....	$1 qu. Oct. 1
Schumacher Wallboard com.	10-31-30	8	9	
Schumacher Wallboard pfd.	10-31-30	.....	23½	50c qu. Nov. 15
Southwestern P. C. units[44]	10-30-30	240	.....	
Standard Paving & Mat. (Canada) com.	10-20-30	15	15½	50c qu. Nov. 15
Standard Paving & Mat. pfd.	10-20-30	.....	83½	1.75 qu. Nov. 15
Superior P. C., A	10-31-30	31	35	27½c mo. Dec. 1
Superior P. C., B	10-31-30	8	10	25c qu. Sept. 20
Trinity P. C. units[37]	11- 1-30	130	140	
Trinity P. C. com.[37]	11- 1-30	30	40	
Trinity P. C. pfd.[29]	10-21-30	107	110	
U. S. Gypsum com.	11- 3-30	37½	38½	40c qu. Sept. 30
U. S. Gypsum pfd.	11- 3-30	118	120	1.75 qu. Sept. 30
Universal G. & L. com.[3]	11- 5-30	No market		
Universal G. & L. pfd.[3]	11- 5-30	No market		
Universal G. & L., V.T.C.[3]	11- 5-30	No market		
Universal G. & L. 1st 6's[3]	11- 5-30	No market		
Warner Co. com.[16]	10-31-30	34	36	50c qu. & 25c ex. Oct. 15
Warner Co. 1st 7% pfd.[16]	10-31-30	99	100	1.75 qu. Oct. 1
Warner Co. 1st 6's[8]	11- 5-30	98	100	
Whitehall Cem. Mfg. com.[38]	10-24-30	80	.....	
Whitehall Cem. Mfg. pfd.[36]	10-24-30	50	.....	
Wisconsin L. & C. 1st 6's[15]	11- 5-30	95	.....	
Wolverine P. C. com.	11- 5-30	.....	3⅞	15c qu. Nov. 15
Yosemite P. C., A com.[9]	10-30-30	2	3	

Quotations by: [1]Watling Lerchen & Hayes Co., Detroit, Mich. [2]Bristol & Willett, New York. [3]Rogers, Tracy Co., Chicago. [4]Butler Reading & Co., Youngstown, Ohio. [5]Smith, Camp & Co., San Francisco, Calif. [6]Frederic H. Hatch & Co., New York. [7]J. J. B. Hilliard & Son, Louisville, Ky. [8]Dillon, Read & Co., Chicago, Ill. [9]A. E. White Co., San Francisco, Calif. [10]Lee Higginson & Co., Boston and Chicago. [11]J. W. Jakes & Co., Nashville, Tenn. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Stern Bros. & Co., Kansas City, Mo. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Citizens Southern Co., Savannah, Ga. [18]Dean, Witter & Co., Los Angeles, Calif. [20]Tucker, Hunter, Dulin & Co., San Francisco, Calif. [21]Baker, Simon & Co., Inc., Detroit, Mich. [22]Peoples-Pittsburgh Trust Co., Pittsburgh, Penn. [24]A. B. Leach & Co., Inc., Chicago, Ill. [25]Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [28]Bank of Republic, Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago, Ill. [33]Boettcher Newton & Co., Denver, Colo. [36]Hanson and Hanson, New York. [37]S. F. Holzinger & Co., Milwaukee, Wis. [39]Tobey and Kirk, New York. [40]Steiner, Rouse and Stroock, New York. [43]Jones, Heward & Co., Montreal, Que. [44]Tenney, Williams & Co., Los Angeles, Calif. [46]Stein Bros. & Boyce, Baltimore, Md. [47]Wise, Hobbs & Arnold, Boston. [48]E. W. Hays & Co., Louisville, Ky. [49]Blythe Witter & Co., Chicago, Ill. [50]Martin Judge Co., San Francisco, Calif. [51]Hemphill, Noyes & Co., New York City.

INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

Stock	Price bid	Price asked
Consolidated Cement com. v.t.c., 3220 shs.[1]	1½ per share	.....
Universal Gypsum and Lime, 300 shs.[3]	$4 for the lot	.....
Universal Gypsum and Lime, 200 shs.[3]	$2 for the lot	.....
Holliston Trap Rock Co. com.,[2] 67 shs., per sh.	35	.....

[1]Price at auction by Wise, Hobbs & Arnold, Boston, Dec. 18, 1929. [2]Price at auction by R. L. Day & Co., Boston, July 16, 1930. [3]Price at auction by Adrian H. Muller & Son, New York, August 6, 1930.

Financial Editor's Comment on Cement Industry

THE FINANCIAL EDITOR of the *Chicago* (Ill.) *Journal of Commerce* analyzes the Alpha Portland Cement Co. (and the cement industry in general) in part as follows:

"While a few of the larger cement producers have been able to make a fairly favorable showing this year, although not equaling 1929 results, a majority of companies in the industry have been adversely affected by the continued smaller demand for their product. The sharp decline in building and residential construction has largely limited an important source of cement sales, and while this has been offset to a considerable degree by the extensive road building programs in various parts of the country, the benefits of the demand for road building purposes have not been shared proportionately by all cement manufacturers.

"Production and sales of cement in the first eight months of this year held up fairly well but prices have continued at low levels. In recent years the large production capacity and sharp competition in the cement industry have caused a steady decline in prices, and the latter part of 1929 showed the lowest levels for the last nine or ten years. The Standard Statistics Co.'s index of portland cement prices, based on 1926 as 100%, showed 1929 average prices at 91.1% of 1926, as compared with 92.7% in 1928, 93.7% in 1927, and 100.1% in 1925. Current prices are above the low levels of the closing months of 1929 but are well below the figures for preceding periods.

"Dollar sales of the Alpha Portland Cement Co. have shown a downward tendency in the last five years and the 1929 net sales of $11,368,969 compared with $13,546,629 in 1928, $13,529,329 in 1927, $12,962,239 in 1926 and $15,459,696 in 1925. Net earnings have followed about the same trend and in the full year 1929 amounted to $1,815,018 as against $2,585,535 in 1928 and $2,359,386 in 1927. The 1929 earnings were equivalent to $90.75 a share on the outstanding preferred and $2.36 a share on common.

Dividend Rate Reduced in July

"With the continued decline in earnings this year the company reduced the dividend rate on the common stock to $2 a share annually with the payment of a quarterly dividend of 50 cents a share in July. Previously the common stock had received $3 a share annually since 1926 when it was changed from $100 par value to no par value. A total of 711,000 of the no-par value common shares were outstanding at September 30, last, in addition to which there was $2,000,000 of 7% preferred stock. The company has no funded debt or bank loans outstanding. The common stock is carried on the balance sheet at a stated value of $24,134,500, and at September 30, 1930, the profit and loss surplus stood at $4,434,296. A year earlier the profit and loss surplus was $5,071,778.

"At current quotations around 21 the common stock returns a yield of more than 9.2%. While the near term outlook for the company is not particularly bright at the present time, it is one of the most important organizations in the cement industry, and since this material is so largely used in the construction of homes, commercial and industrial buildings, as well as hard roads, a return to more normal conditions in building construction should be reflected in larger earnings.

"An excellent financial condition has been maintained by the Alpha Portland Cement Co., and at September 30, 1930, the total current assets of $10,442,137 compared with current liabilities of only $1,028,324. Cash alone amounted to $5,696,939 or more than five times the total current liabilities, while marketable securities amounted to $1,357,975, accounts and notes receivable were $957,331 and inventories were $2,236,986. Land, buildings, machinery, equipment, and coal mine lease were carried at $21,495,585 after deduction of depreciation and depletion reserves, while miscellaneous investments were shown at cost of $273,039. The book value of $28,568,796 applicable to the common stock at September 30, was equivalent to $40.18 a share."

Arundel Corp. Nine Months' Earnings

THE Arundel Corp., Baltimore, Md., reports for nine months ended September 30, 1930, net income of $1,957,000 after depreciation, federal taxes, etc., equivalent to $3.97 a share on 492,556 no-par common shares, comparing with $1,640,695, or $3.33 a share, in first nine months of 1929.

September net income after depreciation and taxes was $226,945, against $197,843 in September, 1929.

Current assets on September 30, last, were $6,084,048, current liabilities $379,977.

Recent Dividends Announced

Cleveland Quarries com. (qu.)	0.75	Dec. 1
Cleveland Quarries extra	0.25	Dec. 1
Consolidated Sand and Gravel pfd. (qu.)	$1.75	Nov. 15
Kentucky Cons. Stone pfd. (qu.)	1.75	Nov. 1
Missouri Portland Cement (qu.)	0.50	Nov. 1
Missouri Portland Cement (extra)	0.50	Nov. 1
Riverside Cement 1st pfd. (qu.)	1.50	Nov. 1
Riverside Cement Cl. A partic. pfd. (qu.)	0.31¼	Nov. 1
Schumacher Wall Board pfd. (qu.)	0.50	Nov. 15
Standard Paving and Materials com. (qu.)	0.50	Nov. 15
Standard Paving and Materials pfd. (qu.)	1.75	Nov. 15
Superior Portland Cement Cl. A. (mo.)	0.27½	Dec. 1
Wolverine Portland Cement (qu.)	0.15	Nov. 15

Wallace Sandstone Quarries, Ltd., Earnings

THE Wallace Sandstone Quarries, Ltd., Toronto, Ont., reports for the year ended May 31:

	1930	1929
Net earnings	$ 107,308	$ 68,618
Depreciation	24,418	20,479
Preferred dividends	23,310	23,334
Surplus	$ 59,580	$ 24,805
Earned per share preferred	$10.56	$6.14

Number of preferred shares, 7,844.

BALANCE SHEET AS OF MAY 31

Assets:	1930	1929
Plant and property	$1,792,115	$1,745,111
Current assets:		
Accounts receivable	237,120	287,502
Cash	49,961	31,548
Securities	1,000	34,461
Contract deposit	.....	1,000
Inventories	287,479	162,640
Total	$2,367,674	$2,262,262
Liabilities:		
Preferred stock	$ 784,400	$ 784,400
Common stock	1,000,000	1,000,000
Current liabilities:		
Accounts payable	127,319	110,913
Bills payable	48,054	39,719
Reserve for insurance, taxes, etc.	1,869	5,197
Depreciation and depletion reserve	213,621	154,041
Surplus	192,410	167,992
Total	$2,367,674	$2,262,262
Current assets	$ 575,560	$ 517,151
Current liabilities	177,242	155,829
Working capital	$ 398,318	$ 361,322

Warner Co. Third Quarter Earnings

THE WARNER CO., Philadelphia, Penn., producers of sand, gravel, lime and central-mix concrete, reports for the quarter ended September 30, 1930, gross sales of $3,809,436 and profit of $303,000, after all charges, including depreciation, depletion, interest, preferred dividends and federal taxes, equal to $1.29 on 234,000 common no-par shares.

This compares with gross sales during the corresponding period last year of $3,715,789 and profit of $370,000, equal to $1.82 a share on 203,000 common no-par shares then outstanding.

Profit in September this year was $64,000, compared with $71,000 in September, 1929.

Fluctuations in the volume and character of construction work in the Philadelphia territory are reflected in both the company's gross sales and earnings figures.

Banker and Lawyer Join Penn.-Dixie Board

PERCY H. JOHNSON, president of the Chemical Bank and Trust Co., and Victor N. Roadstrum, attorney, have been elected additional directors of the Pennsylvania-Dixie Cement Corp., New York City.

Charles N. Reppert

CHARLES N. REPPERT, superintendent of the Northern Indiana Brick Co., sand-lime brick manufacturers, Mishawaka, Ind., was killed in an automobile accident, November 2. He was 72 years old, having been born in Pennsylvania January 27, 1859.

Pacific Northwest Cement Plants Report Activity

ACCORDING to various Seattle, Wash., newspapers: Announcement was made recently by N. D. Moore that the Pacific Coast Cement Co. would operate a 7-day week schedule of 24 hours a day, and would run through the winter without suspension of operations either at the quarry in Alaska or in the plant in Seattle. This means one-quarter of a million dollars in increased payrolls to this city and section during the winter months.

One thousand men, including workers in the quarries on Dall Island, near Ketchikan, Alaska, and employes of the cement plant in Seattle, and also miners of the Pacific Coast Coal Co., which furnishes fuel used by the plant, are affected by this announcement.

The enlarged schedule of operations is rendered necessary, it was explained recently by Nat D. Moore, vice-president of the Pacific Coast Cement Co. and also of the Pacific Coast Coal Co., by existing contracts, and also by the fact that stocks of cement, depleted by heavy shipments this year, must be built up in advance of heavy construction operations in the Pacific Northwest next spring.

"This year the employes of the Pacific Coast Cement Co. plant in Seattle will eat their Christmas turkey on the job," said Mr. Moore. "We're sorry they can't be home to enjoy the traditional bird, but we are even more pleased that our schedule of operations renders it necessary for them to be on the job, even on holidays, throughout the remaining months of this year and as far as we can see in 1931.

"The total number of days of work assured our people, both in the cement plant and in the mines, is approximately 36,000. At a conservative figure this means an increase in the payroll of the two companies this year, as compared with 1929, running between $210,000 and $250,000.

"At a time such as this, when every increase in payroll is welcomed by business men throughout the country, we are especially gratified because we are enabled to make this substantial contribution to the payroll in Seattle and contiguous territory."

Mr. Moore pointed out that the benefits of the enlarged operating schedule would not be exhausted in the quarter-million payroll increase. In the operation of a quarry, mines and mill, supplies in large quantities are required, including such items as timber, lumber, electrical equipment, rails, sheet iron, tools, hardware and ship's supplies for the *Diamond Cement*, the company ship, which brings the lime rock from Dall Island to Seattle. R. W. Smith, chief mining engineer of the cement company, left on this vessel for the north to make arrangements for the increased working schedule at the quarry.

Sales Manager Darwin Meisnest announced that compared to 1929, the Pacific Coast Cement Co. this year has experienced an increase in business of considerably more than 100%; July witnessed an advance of 50% over the same month last year, and August a gain of 120% compared with August, 1929. In 1929, barrels of cement shipped in August totaled 51,510, and this year aggregated 110,393. September registered an increase of exactly 100% over September of last year.

Among the larger contracts responsible for the enlarged production this year, Mr. Meisnest mentioned the Ariel dam at Woodland, Wash., using about 2000 bbl. a day; five bridges under construction in Seattle, the Seattle-Tacoma paving, which took 62,000 bbl., the Denny regrade contract of 60,000 bbl., delivery on which will continue all winter, and the hydroelectric project at Centralia.

"Our dealer organization in two years has grown to 125, in every community of the Pacific Northwest," Mr. Meisnest said, "and we have supplied every type of construction project. The support given us by local business concerns and contractors has been all that the company could hope to have."

President of Superior Cement Quoted

Output of cement by plants in the Pacific Northwest increased 8% last month over September of 1929, according to a report made recently by E. P. Lucas, president of Superior Portland Cement, Inc., which operates the largest plant in the district at Concrete, Wash. Mr. Lucas based his statement on figures collected by the U. S. Bureau of Mines. Six cement factories in Washington shipped 2,008,387 bbl. in the first eight months of this year, an increase of 20% over the like part of 1929, Mr. Lucas said. This is a contrast to the national average, which is 4% under the preceding year's record, for the elapsed portion. This is another circumstance that lends color to the assertion that conditions in the Pacific Northwest are somewhat better than in most other localities of the country.

Illustrating the large tonnages with which cement manufacturers deal, Mr. Lucas mentioned that the Superior Portland Cement recently brought down 250,000 tons of lime rock in one blast at the quarry near Concrete. To accomplish this, 54,000 lb. of dynamite was exploded in holes drilled along the edge of a 200-ft. high cliff. This is a part of Superior Portland's 1931 lime rock supply.

Also Manager of Olympic Cement

With the cement demand in the state described as normal, the Olympic Portland Cement Co.'s Bellingham (Wash.) plant is operating at full capacity now, and will continue to do so until Christmas, Adolph Krabbe, manager, said recently.

Beside filling current orders, Mr. Krabbe said the warehouse is being filled and when storage space is exhausted, production will be curtailed.

States Vote $300,000,000 for Public Works

AT THIS WRITING, it appears from Associated Press dispatches, that in the November 4 elections the expenditure of more than $300,000,000 in state and municipal construction programs has been approved. But while some of the voters were thus endorsing bond issues for that sum, others defeated proposals to assume $37,000,000 indebtedness for similar work.

The largest issue which apparently carried was in New Jersey, where $83,000,000 is to be spent on highways, $7,000,000 for water district improvements and $10,000,000 on public institutions.

Louisiana approved constitutional amendments including issuance of $75,000,000 bonds by the state against anticipated gasoline taxes for 25 years for road building, $5,000,000 for a new state house and a $4,000,000 issue for refinancing the city of New Orleans.

County and city issues at Cleveland for about $40,000,000 worth of street, sewer and river betterments are reported as passed.

Other issues which seem to have passed are: New York state, $50,000,000, some for public institutions; Chicago and Cook county, $28,250,000, street work, playgrounds and water filtration; Baltimore, $16,000,000, paving and other improvements; San Francisco, $850,000, jail; Wyoming, $2,800,000, roads; Oregon, $155,000, bridge.

Voters seemed to have rejected $19,300,000 for power projects and sewers in Los Angeles; also $10,000,000 for Arizona highways, $5,200,000 for an airport and an incinerator at San Francisco, $1,675,000 for public improvements in Washington and $1,250,000 for Oregon water front work.

Three large bond issues were approved by the voters in California, an issue of $35,000,000 for construction of a bridge across the Golden Gate, $20,000,000 for the purchase of farms by World War veterans and $10,000,000 for San Francisco harbor work.

Zonolite Co. Holdings Valued at $10,000,000

ZONOLITE Co. stockholders, representing approximately half of the 350,000 shares of the company's capital stock, met at the city hall, Kalispell, Mont., recently in a special session and declared $10,000,000 as the approximate valuation of the Libby, Mont., property containing, according to estimates, 100,000,000 tons of raw material.

The estimate was made in compliance with a request by the United States Gypsum Co., which also requested quotations on orders of 20,000 tons of raw material a year.

In discussing mining of zonolite with the stockholders, E. N. Alley, president, said circumstances would warrant a $60,000 tramway from the mine to the mill whereby 500 tons of material could be brought to the mill daily.—*Great Falls* (Mont) *Tribune*.

Single Concern to Get Contract for Hoover Dam

THE DEPARTMENT OF THE INTERIOR expects to call for bids for the Hoover Dam undertaking by December 1, according to a statement made public by the Department November 3. The contract will be let about March 1.

The contract will go to a single firm, which first must construct four tunnels to divert the river while the dam is being built, it was pointed out. Cofferdams will turn the water into the tunnels. A mass of dirt and boulders, 100 to 150 ft. thick, must be removed from the river bottom to expose the bed rock on which the dam will rest.

The full text of the statement follows:

The Department of the Interior announces that it expects the specifications for Hoover Dam to be ready by December 1 and that a call for bids for the great undertaking will be issued at that time. The first of the tasks at the dam site will be that of driving four tunnels, each 50 ft. in diameter and about one mile long, through the solid volcanic rock cliffs on each side of the canyon; these to cost from $15,000,000 to $20,000,000.

Bed Rock to Be Cleared

When these tunnels are completed, a cofferdam 80 ft. high will be constructed some distance above the site of the permanent dam, and a similar one below the dam site, their purpose will be to divert the water, no matter how great the floods through the four great tunnels during the time of construction. This will leave the river bed dry.

The initial task at the actual dam site will be to remove from the bed of the river the loose boulders and dirt that lies above bed rock. This loose material is from 100 to 150 ft. thick and it will be a Herculean task to sweep the bed rock clean of it. Not until the tunnels are completed, the river diverted, and the bed rock exposed can the actual construction of the dam itself begin. Starting at bed rock this great concrete structure, 650 ft. long at the base, sloping to a width of 45 ft. at the top will begin to arise to its ultimate height of 727 ft. Here it will constitute a span 650 ft. long over which a transcontinental highway will pass. Building this wedge which reunites the ends of a severed mountain chain will be the final task to be figured on by contractors.

Handled as Single Project

Originally it was thought that it might be wise to let the different items in this final undertaking of dam construction to different contractors. One firm might drive the tunnels on one side of the canyon and another firm those on the other side. A different contractor might build the cofferdam, might excavate for the great dam, might erect that dam. After careful study and consultation with the leading contractors of the nation, however, it was decided that this entire undertaking, through the elimination of duplication, could be more economically handled as a single project.

The bids for this huge contract will call for the expenditure of $60,000,000 to $70,000,000. Not many contracts of this size have been let in the history of the United States. It is known, however, that there are a score of contractors in this country who are capable of handling an undertaking of this size, and a number of bids are expected.

Ninety days will be given contractors to submit their bids. The contract, therefore, is expected to be let about March 1. In the meantime the preliminary contracts bringing transportation to the dam site, providing power, living quarters, water supply, etc., will have been executed. A full force can be put on, furnishing much employment and much stimulation to allied industries.

Protest Use of Canadian Gravel in U. S. Government Building

THE PROPOSED USE of Canadian sand and gravel in the mixing of concrete for the construction of the new $150,000 United States Customs and Immigration building at Blaine, Wash., by Johnson Bros., Seattle contractors, was vigorously protested to the Treasury Department at Washington, D. C., by United States Senator Clarence C. Dill, recently after Senator Dill had received protests from a group of Bellingham and Blaine citizens, headed by Will Hawkins of Bellingham and C. V. Wilder of Blaine.

Approximately 3000 cu. yd. of sand and gravel is required by the specifications for the new buildings, and this, the protestants informed Senator Dill here, has been proposed by the contractors to be purchased in Victoria, B. C., and hauled to Blaine in scows, while there is ample material of high quality available at Blaine. It is understood differences as to prices per yard prompted the contractors to seek the Canadian product for the erection of the federal buildings.—*Bellingham* (Wash.) *Evening News.*

Rock Products Loses a Subscriber — Penalty for Favoring Cement Tariff!

SIRS: We duly received your letter dated September 30, as regards our annual subscription to your publication.

Since last year, the new American tariff has been put into action and you are certainly aware that, according to this new law, the importation of Belgian cement into the United States is absolutely impossible.

Under these circumstances, our Belgian members are not more interested to the ROCK PRODUCTS and, as they have asked us to seek for them outlets in other countries where the trade is easier, we are devoting our budget to subscriptions to other publications.

Please cancel our name from your subscription list. Yours very truly,

AMERICAN-BELGIAN CHAMBER OF COMMERCE, A. C. SUEN, *Secretary.*

Virginia Glass Sand Plant Burned

FIRE, believed of incendiary origin, recently all but wiped out the glass sand plant of the Eastern Silica and Chemical Co., 12 miles west of Winchester, Va. The loss is estimated by John F. Penrose, president, at $100,000, partly insured.

He said the plant will be rebuilt as soon as insurance adjustments are made. The fire was within two miles of the village of Gore, half of which had been leveled by flames in August, with a loss of $500,000.

Efforts to call Winchester firemen by Dewey Shoemaker, night watchman, were fruitless and it was discovered that the telephone wires between the plant and the Gore exchange had been cut with snippers a quarter of a mile from the works.

Mr. Shoemaker said he saw the fire on returning from his boarding house, where he had lunched, and was not absent from the plant over 30 minutes. He declared the fire was in a corner of an old wash room, where sand is washed before grinding, and that no fire is kept there. It was then beyond his control. Employes living in the vicinity responded to an alarm, but could save nothing.

Altogether nine frame buildings were consumed, 11 electric motors, an air compressor and all the machinery, most of which, of a modern type, had been installed only recently. The power house and electric generator alone escaped.

Buildings destroyed included two washrooms, two crusher rooms, wet bin, drier room, boiler and engine rooms, operating and drying room and an immense drying bin. Two cars loaded with glass sand burned.

The company is owned by Philadelphia and New York capitalists. About 50 men were thrown out of work by the fire, which is being investigated by the sheriff's office.—*Washington* (D. C.) *Post.*

Wisconsin Lime Manufacturers Establish Research Fellowship

IN ORDER that the exact strength of the Wisconsin lime mortar might be determined the Wisconsin Lime Manufacturers' Association some time ago set aside a fund for research at the University of Wisconsin to study the strength of the lime. Ivan Cole, Milwaukee, was granted a research fellowship to carry on the work.

The preliminary tests, just completed, show that the Wisconsin product is of great strength. The results were recently disclosed at a meeting of representatives of the lime manufacturing association.

The present research schedule calls for the testing of 3,000 specimens of Wisconsin lime mortars during the next six months. In this way the specific values of the Wisconsin product will be determined.

The lime tested comes from approximately 20 plants scattered throughout the state.—*Milwaukee* (Wis.) *Journal.*

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

	Limestone Flux Week ended		Sand, Stone and Gravel Week ended	
	Oct. 4	Oct. 11	Oct. 4	Oct. 11
Eastern	3,136	3,050	10,513	10,151
Allegheny	2,651	2,770	6,226	8,064
Pocahontas	426	487	1,614	1,687
Southern	574	561	10,974	9,989
Northwestern	1,147	1,112	6,926	6,593
Central Western	518	531	11,147	9,688
Southwestern	400	433	6,640	5,582
Total	8,852	8,944	54,040	51,754

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1929 AND 1930

	Limestone Flux Period to date		Sand, Stone and Gravel Period to date	
	1929	1930	1929	1930
District	Oct. 12	Oct. 11	Oct. 12	Oct.11
Eastern	138,305	119,156	464,161	334,628
Allegheny	147,600	112,265	297,974	261,519
Pocahontas	15,540	18,893	40,243	51,553
Southern	23,557	25,870	364,139	331,386
Northwestern	46,879	39,380	261,750	224,770
Central Western	21,363	19,338	433,913	403,181
Southwestern	20,357	18,341	279,507	263,770
Total	413,601	353,243	2,141,687	1,870,807

COMPARATIVE TOTAL LOADINGS, 1929 AND 1930

	1929	1930
Limestone flux	***413,601***	***353,243***
Sand, stone, gravel	***2,141,687***	***1,870,807***

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week of November 1:

SOUTHERN FREIGHT ASSOCIATION DOCKET

52249. **Crushed marble or marble chips** (imported), from South Atlantic ports to Atlanta, Ga. It is proposed to establish reduced rate of 207c per net ton on crushed marble or marble chips, carloads (See Note 3), from Charleston, S. C., Savannah, Ga., Brunswick, Ga., and Jacksonville, Fla. (shipside), when imported from foreign countries, to Atlanta, Ga. The proposed rate is the same as approved under Submittal No. 51113 from Mobile, Ala., on similar traffic.

52266. **Silica stone**, from M. & O. R. R. stations in Illinois to Black Fox, Tenn. Class rates now apply. Proposed rate on silica stone, crude, not crushed or ground, carloads (See Note 2), but not less than 60,000 lb., from M. & O. R. R. stations, viz., Tamms, Gravel Pit, Elco, Mill Creek, Weaver Hill, White House and Jonesboro, Ill., to Black Fox, Tenn., 18c per 100 lb. Made in relation to rates on crude silica stone between southwestern points, as published in Agent Johanson's Tariff I. C. C. 2187.

52268—Cancellation. **Limestone, crushed,** carloads, from La Follette, Tenn., to Jellico, Tenn. It is proposed to establish reduced rate of 207c modity rate of 79c per net ton on limestone, crushed, carloads, minimum weight 30 net tons, from La Follette, Tenn., to Jellico, Tenn. Investigation develops that there has not been a movement for some time, nor is there prospect of a movement. Scale rates, as shown in Agent Glenn's I. C. C. A-655, to apply after cancellation.

52269—Cancellation. **Limestone**, from Sadie and Winner, Tenn., to Bristol, Va.-Tenn. It is proposed to cancel, on the obsolete theory, the present commodity rate of 102c per ton of 2240 lb. on limestone, carloads, minimum weight 40,000 lb., from and to above-named points. Rates to apply after cancellation: On crushed limestone, rates shown in Agent Glenn's I. C. C. A-655, to apply; on ground or pulverized limestone, class rates to apply.

51931. Amendment 2. **Lime** (calcium), crude, phosphate of, from Nashville, Tenn., to Chicago Heights, Ill., and Jersey City, N. J. Submittal 51931, included in Docket 540, for September 22, 1930, hearing, proposed rates on lime (calcium), crude, phosphate of, in bulk in bags, carloads, minimum weight 45,000 lb., from and to above-named points. The proposition was amended by Amendment No. 1, included in Docket 542, for October 6 hearing, to eliminate the word "crude" from the commodity description. Amendment No. 1 is now withdrawn, which has the effect of restoring the original submittal to the docket.

52387. **Stone, crushed,** coated with oil, tar or asphaltum, from Snow Flake, W. Va., to Reidsville, N. C. Present rate, 32c per 100 lb. It is proposed to establish rate on crushed stone, coated with oil, tar or asphaltum (amiesite), carloads (See Note 3), from Snow Flake, W. Va., to Reidsville, N. C., 230c per net ton. Made on basis of I. & S. Docket 1885 scale.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

52389. **Calcite, ground or pulverized,** from Cartersville, Ga., and Sparta, Tenn., to Chardon, O. Cincinnati, O., combination now applies. Proposed rates on calcite, ground or pulverized (ground or pulverized limestone), carloads (See Note 1), except when car is loaded to full visible capacity actual weight will apply, to Chardon, O., from Cartersville, Ga., 578c and from Sparta, Tenn., 571c per net ton. Same as at present applicable to Ashtabula, O.

52393. **Gravel,** from Gravelton, N. C., to Warners, N. J. Lowest combination now applies. Proposed rate on gravel, carloads (See Note 3), from Gravelton, N. C., to Warners, N. J., 530c per net ton. Made in line with rates on gravel, carloads, from producing points in the south to destinations in the east.

52423. **Marble, crushed, etc.,** from Tate, Ga., to Good Hope, La. Present rate, 540c per ton of 2000-lb. (See Note 1) (New Orleans, La., combination). Proposed rate on marble, crushed, ground or pulverized, carloads (See Note 1), except when loaded to full visible capacity, actual weight will govern, from Tate, Ga., to Good Hope, La., 300c per ton of 2000 lb.

52454. Cancellation. **Cement,** from Sandersville, Ga., to various destinations. It is proposed to cancel on the obsolete theory the present published commodity rates on cement from Sandersville, Ga., to all destinations shown in Agent Glenn's I. C. C. No. A718, Freight Tariff No. 41D.

52467. **Sand and gravel,** from Twohy Siding, Va., to Atlantic Coast Line R. R. and Seaboard Air Line R. R. stations in Virginia. It is proposed to publish rates on sand and gravel, in straight or mixed carloads (See Note 3), on basis of the Trunk Line Scale prescribed by the Interstate Commerce Commission in Docket 17517, from Twohy Siding, Va., to A. C. L. R. R. and S. A. L. Ry. stations in Virginia south of Richmond and Norfolk, Va., to the Carolina line inclusive, in lieu of the present combination rates. Statement of proposed rates will be furnished upon request.

52484. **Dolomite, roasted,** from Cincinnati, O., to East Birmingham and Fairfield, Ala. Combination rates now apply. It is proposed to establish on dolomite, roasted, carloads, minimum weight 40,000 lb., from Cincinnati, O., to East Birmingham and Fairfield, Ala., rate of 17c per 100 lb., same as currently in effect to Birmingham, Ala.

52496. **Cement,** from Southern producing points to points in Missouri (south of the Missouri river) and Kansas. It is proposed to establish rate on cement, hydraulic, natural or portland, straight or mixed carloads, minimum weight 50,000 lb., except that when marked capacity of car is less, the actual weight, but not less than 40,000 lb., will apply. From Chattanooga, Tenn., Clinchfield, Ga., Cowan, Tenn., Knoxville, Tenn., Kosmosdale, Ky., Leeds, Ala., Nashville, Tenn., Portland, Ga., Ragland, Ala., Richard City, Tenn., and Rockmart, Ga., to points in Missouri (south of the Missouri river) and Kansas as follows: I. C. C. Docket 8182 Scale 3 to Missouri and eastern Kansas and Scale 4 to western Kansas.

52499. **Slag,** ground, from Birmingham, Ala., and Group to points in Southern Freight Association territory. It is proposed to establish rates on ground slag, carloads, minimum weight 80,000 lb., from Birmingham, Ala., and Group to points in S. F. A. territory on basis of 10% of first class.

52604. **Asbestos sand,** from Hollywood, Ga. (Tallulah Falls Ry.) to Columbus and Fort Benning Junction, Ga. Eighth class rates now apply. Proposed rates on asbestos sand, carloads, minimum weight 40,000 lb., from Hollywood, Ga. (Tallulah Falls Ry.) to Columbus, Ga., 20c; Fort Benning Junction, Ga., 23c per 100 lb.—made in line, distance considered, with rates between other southeastern points.

52609. **Slag,** from Copperhill, Tenn., to Fulton, N. Y. Combination rate now applies. Proposed rate on slag (not basic slag), granulated, lump or pulverized (See Note 3), from Copperhill, Tenn., to Fulton, N. Y., 637c per net ton—made same as currently in effect to various other points in New York in the same vicinity.

52629. **Rubble and flagging stone,** from points in Tennessee to Bethesda, Md., and Georgetown, D. C. Combination rates now apply. Proposed rates on rubble, $4.30 per net ton, and flagging stone, $4.50 per net ton, carloads (See Note 2), from Tennessee Central Ry. stations named in Items 9605B and 9611A of Supplement 32 to Agent Speiden's Eastbound Tariff 38H, I. C. C. 1337, to Bethesda, Md., and Georgetown, D. C., same as in effect to Washington, D. C., and Baltimore, Md.

52270. **Slag,** Birmingham, Ensley, Bessemer and North Birmingham, Ala., to Rutherfordton, N. J. Lowest combination now applies. Proposed rate on slag, granulated, lump or pulverized, carloads (See Note 3), from and to above-named points, 667c per net ton. Made with relation to rate in effect to Rutherfordton from Copperhill, Tenn.

WESTERN TRUNK LINE DOCKET

6753-B. **Stone, crushed or ground,** carloads (See Note 3), but not less than 40,000 lb., from White Bear, Mo., to Oshkosh and Eau Claire, Wis., and Menominee, Mich., and points taking same rates as per W. T. L. 76-P, E. B. Boyd's I. C. C. A-1897. Rates in cents per net ton:

To	Pres.	Prop.
Oshkosh, Wis.	305	240
Eau Claire, Wis.	305	240
Menominee, Mich.	345	280

7415. **Sand,** carloads (See Note 2), but not less than 40,000 lb., from Ottawa, Ill., to St. Paul (Fordson), Minn. Present rate, $2.40 per net ton; proposed, $2.15 per net ton.

365-C. **Sand and gravel,** carloads, minimum weight as per Item 2180 of W. T. L. Tariff 13P, from Mason City, Ia., to points in Minnesota. Present rates as per Item 2180, W. T. L. Tariff 13P; proposed:

	Single line	Joint line
50 miles and over 40	80	95
60 miles and over 50	85	100
70 miles and over 60	90	105
80 miles and over 70	95	110
90 miles and over 80	100	115
100 miles and over 90	105	120
110 miles and over 100	110	125
120 miles and over 110	115	130
130 miles and over 120	120	135
140 miles and over 130	125	140
150 miles and over 140	130	145
160 miles and over 150	135	145
170 miles and over 160	140	150
185 miles and over 170	145	155
200 miles and over 185	150	160

2814-C. **Stone, crushed,** carloads (See Note 2), but not less than 40,000 lb. (when loaded in hopper bottom ore cars, 75,000 lb), from Pinehill, Mich., to Wilmington, Ill. Present rate, $3.33 per net ton (Joliet combination); proposed, $2.70 per net ton.

SOUTHWESTERN FREIGHT BUREAU DOCKET

21292. **Asphalt rock,** from Texas points to points in Louisiana, Vicksburg, Miss., etc. To extend the expiration date to December 31, 1931, in con-

nection with rates on asphalt rock, natural or coated, not to exceed 5% of road oil, crushed or ground, carloads, from Texas points on the Asphalt Belt Ry. and T. & N. O. R. R. to points in Louisiana, also Vicksburg, Miss., and Lorraine, La.-Tex. These rates as now published are scheduled to expire on December 31, 1930; however, conditions influencing the establishment of these rates have not changed; therefore it is necessary to extend the expiration date or period to another year.

21302. **Lime,** from Missouri points to Des Moines, Ia., etc. To establish a rate of 17c per 100 lb. to Des Moines, Ia., and the following rates to other points in Iowa, Missouri, etc., shown below, on lime, carloads, as described in St. L.-S. F. Ry. Tariff 69L, minimum weight 30,000 lb., from Brickeys, Byers, Mosher and Ste. Genevieve, Mo.:

TO C. B. & Q. STATIONS

*Index Nos.		Rates
20630	Middletown, Ia., to	
20770	Osceola, Ia.	17
20775	Murray, Ia., to	
20880	Council Bluffs, Ia.	19
21070	Libertyville, Ia., to	
21145	Des Moines, Ia.	17
21150	Derby, Ia., to	
21290	Gentry, Mo.	19
21295	Oakley, Ia., to	
21365	Jamison, Ia.	17
21370	Leslie, Ia., to	
21400	Cainesville, Mo.	19
21440	Kent, Ia., to	
21500	Amazonia, Mo.	19
21530	Shenandoah, Ia., to	
21540	Riverton, Ia.	19
51750	Illasco Junction, Mo., to	
21780	West Quincy, Mo.	17
21790	Lagrange, Mo., to	
21805	Gregory, Mo.	17
21920	Mooar, Ia., to	
22045	Moulton, Ia.	17
22050	Royal Mines, Ia., to	
22125	Foraker, Ia.	19
22130	Sumner, Mo., to	
22160	Carrollton, Mo.	20½
22165	Wayland, Ia., to	
22225	Guinn, Ia.	17
22230	Dean, Ia., to	
22365	Norwich, Ia.	19
22370	North River, Mo., to	
22440	Macon, Mo.	17
22445	Bevier, Mo., to	
22575	St. Joseph, Mo.	19
22580	Keystone, Mo., to	
22620	Randolph, Mo.	20½
22695	Haynies, Ia., to	
22780	Nodaway, Mo.	19
22785	Mound City, Mo., to	
22860	Page Center, Ia.	19
22865	Coal City, Ia., to	
22910	Yarrow, Mo.	19

Q. O. & K. C. STATIONS

58175	Kirksville, Mo., to	
58235	Taylor, Mo.	17
58075	Osborne, Mo., to	
58170	Novinger, Mo.	19
58000	Avondale, Mo., to	
58070	Moore's Siding, Mo.	20½
63770	Des Moines, Ia., to	
63815	Howell, Ia.	17
63820	Harvey, Ia., to	
63995	Cairo, Mo.	17
64155	Evansville, Mo., to	
64185	Clapper, Mo.	17
64190	Monroe, Mo., to	
64205	Rensselaer, Mo.	17

*Per St. L.-S. F. Tariff 69L.

The rates shown above were checked in by representatives of the various interested destination lines and have been submitted to this bureau for concurrence.

21328. **Talc, ground or crude,** from Memphis, Tenn., when originating Cartersville, Ga., to Tulsa, Okla. To establish a proportional rate of $5.50 per ton of 2000 lb. on talc, ground or crude, in boxes or bulk, carloads, minimum weight 36,000 lb., from Memphis, Tenn., when originating at Cartersville, Ga., to Tulsa, Okla. Shippers state that this commodity is used in the manufacture of paint, as a filler, and has practically the same value as silica, or approximately $15 per ton. Competition is encountered with shippers of silica from nearby points, from which the rates are considerably less than talc, from Cartersville, Ga., and the proposed rate is necessary to move the traffic.

21345. **Asphalt rock,** from Dougherty, Okla., to points in Iowa, Illinois, Kansas, Missouri and Nebraska. To establish the following on **asphalt rock, crushed,** containing approximately 7% asphalt or crude oil, carloads (See Note 1), except where car is loaded to full visible capacity actual weight to govern, from Dougherty, Okla., to points in Iowa on and south of the C. R. I. & P. through Council Bluffs, Des Moines, Newton, Grinnell, Iowa City, Wilton and Davenport; Illinois, on and north of the C. & E. I. through Pana, Villa Grove and Woodland; Kansas; Missouri, on and north of the St. L.-S. F. through Neosho, Aurora, Monett, Springfield, Cuba and St. Louis; Nebraska, on and east of the C. R. I. & P., through Fairbury, Lincoln and Omaha:

To points in Kansas, also points in Missouri south of the Missouri river, except Kansas City and St. Louis, also Nebraska points taking Group 301 as per S. W. L. Territorial Directory No. 2, publish rates by application of the Southwestern Scale of Column 100 to competitive or common points, proposed rates to be 10% of the Column 100 rate. Rates to local stations are to be graded over such junction and common points.

To points in Illinois, Iowa, Missouri and Nebraska, where group rates are applicable to S. W. L. Tariff 151, proposed rates are to be 10% of the Column 100 rate.

It is to be understood that the proposed rates do not contemplate any change in the present rate to Kansas City, Mo., and intermediate points where current rate is 13c per 100 lb. This rate has been prescribed by order of the commission in Docket 15926, G. G. Rodebush vs. A. T. & S. F. et al., 96 I. C. C. 319.

All conflicting rates to be canceled.

Matter to be referred to rate check.

It is stated that at the present time there are no through rates generally and that under the existing circumstances the above basis appears to be fair.

21364. **Ground basic slag,** from New Orleans, La., to points in Louisiana. To establish proportional rate of 10½c per 100 lb. on ground basic slag, not pulverized, carloads, minimum weight 80,000 lb., from New Orleans, La., to T. & N. R. R. main and branch line stations, Avondale, La., to Sabine River, La., inclusive. It is desired to establish the proportional rate previously applicable on this traffic prior to the publication of Class C rates in S. W. L. Tariff 151.

21384. **Lime,** from Missouri and Arkansas points to Braggs and West Memphis, Ark. To establish a rate of 15½c per 100 lb. on lime (calcium), common, hydrated, quick or slaked, carloads, minimum weight 30,000 lb., from Ash Grove, Galloway, Osceola, Peirce City, Sequiota, Springfield, Mo., Johnsons, Ark., Brickeye, Byers, Mosher and Ste. Genevieve, Mo., to Braggs and West Memphis, Ark. Present rate is considered excessive in view of the fact that rate to Marion, Ark., is 14c.

21385. **Sand and gravel,** from Caruthersville, Mo., to Malden, Mo. To establish a rate of 75c per ton of 2000 lb. on sand, except asbestos sand; gravel; straight or mixed carloads, minimum weight 80,000 lb. or if marked capacity of car is less than 80,000 lb., marked capacity will govern, from Caruthersville, Mo., to Malden, Mo., on intrastate traffic. The above change is for the purpose of meeting rate via other lines.

21397. **Marble and stone,** from points in Alabama, Georgia and Tennessee to points in the Southwest. To cancel rates on crushed marble and crushed stone, carloads, from Gantt's Quarry, Ala., Tate and Whitestone, Ga., and Knoxville, Tenn., to points in Arkansas, Louisiana, Oklahoma and Texas as published in S. W. L. Tariffs 1-Q, 2-M, 15-N and 58-Q. This adjustment, it is stated, will also have the effect of correcting a maladjustment in the rates from Gantt's Quarry, Ala., versus Whitestone, Ga., the present through rates from the former points being much higher than the through rates from the latter point, although the distance involved is considerably less.

21406. **Cement,** from St. Louis, Mo., and East St. Louis, Ill., to Dewey, Okla. To establish rate of 16c per 100 lb. on cement, portland or hydraulic, carloads, minimum weight 50,000 lb., from St. Louis, Mo., and East St. Louis, Ill. (on traffic originating at points east of the Illinois-Indiana state line), to Dewey, Okla. It is felt that the proportional rate from East St. Louis and St. Louis should be reduced to reflect the present north-bound rate.

21407. **Cement,** from Atco, Tex., to points in Oklahoma. To establish rate of 32c per 100 lb. on cement, carloads, description and minimum weight as per S. W. L. Tariff 155-A, from Atco, Tex., to B. M. & E. R. R. stations, Hovey, Tracy and Eva, Okla. The B. M. & E. Ry. has extended its line west of Hough, Okla., and the stations shown are on the new extension. Shippers have requested publication of rates in order that they may be on a parity with shippers located at Concrete and Portland, Colo., from which points rates have just recently been approved to these new stations.

CENTRAL FREIGHT ASSOCIATION DOCKET

26143. To establish on **sand and gravel,** carloads (See Note 3), from Winona Lake, Ind., to Gary, Ind., in connection with the I. H. B. R. R. and M. C. R. R., as delivering carriers, rate of 95c per net ton. Present, 88c per net ton.

25940. To establish on **crushed stone,** carloads (See Note 3), from Lima, O., to Defiance, O., rate of 90c per ton of 2000 lb. Present—70c per ton of 2000 lb., as per D. T. & I. R. R. Tariff 1186F.

26122. To establish on **pulverized limestone,** in sacks, in box cars, carloads (See Note 3), from Sibley, Mich., to La Grange, Ind., rate of $1.45 per net ton. Route—Via N. Y. C. R. R.-Kendallville, Ind.-P. R. R. Present, $2.04 per net ton.

26223. (a) To amend agency and individual lines tariffs naming rates on **sand, gravel, slag, stone,** viz.: **Crushed, ground or pulverized; agricultural limestone; limestone, crushed, ground or pulverized; stone dust; rip rap; rubble, quarry scrap; stone screenings; fluxing furnace or foundry; crude; dolomite, raw or crude (unburned); tailings; waste; breakwater; chip; grout and spauls,** between points in C.F.A.L. territory as described in C. F. A. L. Tariff 130T, also from points in aforesaid territory to points east of the western termini of Eastern Trunk Lines, by providing that said rates will only apply on traffic moving in open top car equipment.

(b) To establish on commodities named in Proposition (a) when in bulk or in bags, barrels or in packages, in closed car equipment, carload minimum weight 50,000 lb., from, to and between points enumerated in Proposition (a), rates on basis of 60% of sixth class.

26270. To establish on **soapstone or talc,** ground, crude, in bags, carloads, minimum weight 40,000 lb., from Joliet, Ill., to Akron, O., rate of $1.49 per net ton. Present, 19c per 100 lb.

26475. To establish on **limestone, agricultural** (not ground or pulverized), in bulk, in open-top cars; **stone, crushed,** in bulk, in open-top cars, and **stone screenings,** in bulk, in open-top cars, in straight or mixed carloads (See Note 3), from Woodville, Gibsonburg and Maple Grove, O., to points in Michigan, rates as illustrated in Exhibit "A" attached. Present—As shown in Exhibit "A" attached.

EXHIBIT "A"

To representative points in Michigan	From Woodville, O. Prop. rate	Woodville, O. Pres. rate	Gibsonburg, O. Prop. rate	Gibsonburg, O. Pres. rate	Maple Grove, O. Prop. rate	Maple Grove, O. Pres. rate
Ramona	175	185	175	185	175	185
Brohman	175	185	175	185	185	185
Biteley	175	185	175	185	.....	.....
Alderson	175	(1)	175	(1)	185	(1)
Baldwin	175	185	175	185	185	185
Whitesall-Montague	175	185	185	185	.....	.....
Rothbury	185	185	185	185	.....	.....
New Era	185	195	185	195	.....	.....
Shelby	185	195	185	195	.....	.....
Mears	185	195	185	195	.....	.....
Hart	185	195	195	195	.....	.....
Pentwater	195	(1)	195	(1)	195	(1)
Sanford	145	175	145	175	155	175
N. Bradley	145	175	145	175	155	175
Coleman	145	175	155	175	155	175
Beaverton	155	(1)	155	(1)	155	(1)
Wise	145	(1)	155	(1)	155	(1)
Leaton	155	(1)	155	(1)	155	(1)
Mt. Pleasant	155	(1)	155	(1)	165	(1)
Herrick	155	175	155	175	155	175
Clare	155	175	155	175	155	175
Galliver	155	(1)	155	(1)	165	(1)
Matton	155	(1)	155	(1)	165	(1)
Manns Siding	155	(1)	155	(1)	165	(1)
Harrison	155	(1)	165	(1)	165	(1)
Farwell	155	175	155	175	165	175
Lake	155	175	155	175	165	175
Chippewa	155	175	165	175	165	175
Sears	165	175	165	175	165	175
Evart	165	175	165	175	165	175
Hersey	165	175	165	175	175	175
Reed City	165	175	165	175	.....	.....
Olivers	165	185	175	185	175	185
Chase	175	185	175	185	175	185
Branch	175	185	175	185	185	185

(1) No commodity rate. Class rates apply.

26485. (1) To establish on **stone,** carloads, as shown in Items 85, 90 and 110, page 38, of N. Y. C. Stone Tariff, I. C. C. LS-1358, to Lannon,

Wis., rates as shown below:

From—	Item 85	Item 90	Item 110	Pres. rate
Berea, O.	16	16	17½	27
Amherst, O.	16	16	17½	26½
Wakeman, O.	16	16	17½	26½
Sandusky, O.	16	16	17½	26½

Present rates, sixth class per C. F. A. L. Tariff 230A, I. C. C. 1938.

26526. To establish on **crushed stone and stone screenings** (See Note 3), but not less than 72,000 lb., from Annandale, Branchton, Harrisville and Osbornes, Penn., rates as shown below (rates in cents per 2000 lb.):

To N. Y. C. R. R. Stations.	Prop.	Pres.
Pecan, Penn.	90	80
Browns Spur, Penn.	90	80
Ajax, Penn.	100	80
Belmar, Penn., to Fernbank, Penn.	100	80
Van, Penn., to Billings, Penn.	100	90
Shippenville, Penn.	110	90
Byners Spur, Penn.	110	90
Electra, Penn., to Sutton, Penn.	110	100
Glenn, Penn., to Rose Siding, Penn.	120	110

26527. To establish on **lake and beach sand, carloads** (See Note 2), from Michigan City, Ind., to Mishawaka, Ind., rate of $1.26 per net ton. Route—Via C. I. & L. Ry., Otis, Ind., N. Y. C. R. R. Present—12c.

26529. To establish on **sand and gravel**, in open-top cars, carloads (See Note 3), from Sargents, O., to Boncar, W. Va., rate of $1.55 per ton of 2000 lb. Route—Via N. & W. Ry., Kenova, W. Va., C. & O. Ry., Charleston, W. Va., and N. Y. C. R. R. Present—18½c.

26536. To establish on **sand and gravel**, carloads (See Note 3), from Dayton, O., to Conover, O., rate of 80c per net ton. Route—Via B. & O. R. R., Piqua, O., thence P. R. R. Present—$1.40 per net ton.

26546. To cancel rate of 80c per net ton on **crushed stone**, carloads, from Greencastle, Ind., to Terre Haute, Ind., in connection with the Penna. R. R., published opposite Index No. 11260 on page 64 of C. C. C. & St. L. Ry. Tariff No. 1770X, allowing classification basis to apply in lieu thereof.

TRUNK LINE ASSOCIATION DOCKET

24679. **Crude gypsum rock**, carloads (See Note 2), but not less than 80,000 lb., from Akron, Clarence Centre, Oakfield, Transit and Wheatville, N. Y., to Neville Island, Walford, New Castle, Bessemer, Braddock, Crescentdale, East New Castle, Homestead, North Bessemer, Pittsburgh, Rankin, West Homestead and Wampum, Penn., $2.50 per ton.

24965. **Crushed stone and screenings**, carloads (See Note 2), from Centre Hall, Penn., to Lewisburg, Penn., 90c per net ton. (Present rate $1 per net ton.) Reason—Proposed rates are comparable with rates on like commodities for like distances, within the same general territory.

24967. **Silica rock**, carloads (See Note 2), from Thayer, W. Va., to Philo, O., $2.40 per net ton. (Present rate $6.70 per net ton, sixth class.) Reason—Proposed rate is comparable with rate from Cumberland, Md.

24815, Sup. 1. **Dolomite, roasted**, carloads, minimum weight 60,000 lb., from Martinsburg and Millville, W. Va., to Washington, Penn., $1.94 per gross ton; also amend original proposal to read $1.94 per gross ton instead of per net ton.

24980. **Sand and gravel**, carloads (See Note 2), from Oaks Corners, N. Y., to Newfield, N. Y., 85c per net ton. (Present rate, 91c per net ton.) Reason—To meet motor truck competition.

24986. **Cement, common, hydraulic, natural or portland**, in cloth or paper bags, barrels or in bulk, carloads, minimum weight 50,000 lb., but not less than 40,000 lb., from Portland Point, N. Y., to points on the Morristown & Erie R. R., Essex Falls, N. J., to Morristown, N. J., incl., 15½c per 100 lb. (Present rate, 25c per 100 lb., sixth class.) Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

24988. To provide for the application of the Albany basis of rates on **molding sand**, carloads (See Note 3), from Round Lake, Ballston Lake, Ballston Spa, Saratoga Springs and Gansevoort, N. Y., to points in Central Freight Association territory taking basis numbers 60A to 120, incl., in lieu of the present Round Lake and Rouses Point basis published in Agent Curlett's I. C. C. A265, to apply via all standard routes shown in Agent Curlett's I. C. C. A209. Reason—Proposed rates are comparable with rates from Mechanicville and Schuylerville, N. Y., to same points.

24993. **Crushed stone**, carloads (See Note 2), from Bound Brook, N. J., to Hampton, N. J., 75c per net ton. (Present rate, 81c per net ton.) Reason—Proposed rate is comparable with rates to Matawan and Flemington, N. J.

24995. **Limestone, crude, fluxing, foundry and furnace**, carloads (See Note 2), from Thomasville, Penn., to Curtis Bay, Md., $1.13 per gross ton. (Present rate, 15½c per 100 lb.) Reason—Proposed rate is comparable with rate from Pinesburg, Md., to Curtis Bay, Md.

24996. **Rock, phosphate, crude, lump, ground or dissolved, and superphosphate** (acidulated phosphate rock), in bulk, carloads, minimum weight 40,000 lb., from Baltimore, Md., to Spring Gap, Md., 16c per 100 lb. (Present rate, 23½c per 100 lb.) Reason—Proposed rate is comparable with rate from Baltimore, Md., to Buffalo, Dunkirk, N. Y., etc.

25002. **Cement, common, hydraulic, natural or portland**, in cloth or paper bags, barrels or in bulk, carloads, minimum weight 50,000 lb., but not less than 40,000 lb., from Portland Point, N. Y., to Wharton & Northern R. R., Wharton Jct. and Lake Jct., N. J., 15c per 100 lb., Mt. Pleasant, N. J., to Green Pond Jct., N. J., incl., 15½c per 100 lb. (Present rate, sixth class.) Reason—Proposed rates are on basis of 114% of I. C. C. Docket 12710 scale.

25003. **Stone, fire, ganister**, carloads (See Note 2), from Barree, Brookes Mills, Penn., Cumberland, Md., Flowing Spring, Hannah, Harbison-Walker Refractories Co., No. 16, Madley, Moores Mills, Mt. Union, Reedsville and Wolfsburg, Penn., to Philo, O., 12½c per 100 lb. (Present rate, sixth class.) Reason—Proposed rate is comparable with rates from Barree, Penn., and Cumberland, Md., to Dover and New Philadelphia, O.

25006. **Cement**, carloads, minimum weight 50,000 lb., but not less than 40,000 lb., from Binnewater, N. Y., to destinations in Massachusetts, New England Freight Association territory, as shown below (rates in cents per 100 lb.):

N. Y., N. H. & H. R. R.	Prop. rate		Prop. rate
Sheffield	11	Northampton	13
Great Barrington	11	Westfield	13
Van Deusenville	11	Turners Falls	13
State Line	11½	Central Vermont Ry.	
Pittsfield	11½		
Holyoke	13	Rouses Point, N.Y.	16
East Hampton	13	East Swanton, Vt.	16

Reason—Present commodity rates are not on proper basis and it is the purpose of this proposal to place them on the proper basis.

ILLINOIS FREIGHT ASSOCIATION DOCKET

5914. **Crushed stone**, carloads (See Note 1), from Stolle, Ill., to N. Y. C. & St. L. Ry. stations. Rates in cents per ton of 2000 lb.:

To	Pres.	Prop.
Kaufman, Ill.	98	86
New Douglas, Ill.	98	86
Sorento, Ill.	98	86
Panama, Ill.	107	86
Donnellson, Ill.	107	86

5915. **Novasulite gravel**, carloads (See Note 2), to establish commodity rate of 88c per net ton from Olive Branch and Wiggs Spur, Ill., to Gravel Pit and Elko, Ill.

5856. **Gravel**, carloads (See Note 1), from Pekin, Ill., to Delavan, Ill. Present rate, 76c; proposed, 63c per net ton.

TEXAS-LOUISIANA TARIFF BUREAU DOCKET

S-7893-TX. **Lime**, carloads, from Lime City, Oglesby, Excellent, to points in Texas. Proposition from carriers to add Note "C" under Item 2515 of Tariff 2K to read:

"Rates applying from McNeil shall also be observed as maxima on shipments from Lime City, Oglesby or Excellent to the same points."

Industrial Sand Cases 1930

IN THE September 27 issue of ROCK PRODUCTS we reported the hearing before the Interstate Commerce Commission on freight rates on industrial sands held at Washington, D. C., on September 9 to 19, 1930.

The case has been continued and another hearing will be held on November 21, 1930, at ten o'clock standard time, at the Hotel Sherman, Chicago, Ill., before Examiner Fuller.

The following complaints which were not included in the proceedings at Washington, will be heard at the Chicago hearing:

Docket No. 23796, Eureka Flint & Spar Co. v. Akron, Canton & Youngstown Railway Company, et al., in which the rates on sand, in carloads, from Trenton and Menantico, N. J., to destinations in New York, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, Ohio, Indiana, Illinois, Michigan and Wisconsin, are attacked as unreasonable and unduly prejudicial in favor of producers in the Mapleton, Penn., Hancock, Md.-W. Va., and Ottawa, Ill., districts, and reasonable and nonprejudicial rates for the future are sought.

Docket No. 23889, Industrial Silica Corporation v. Akron & Barberton Railroad Company et al., in which the rates on sand, in carloads, from Barr, Beach City, Bedford, Brewster, Dundee, Geauga Lake, Massillon, Phalanx, and Warwick, Ohio, to destinations in Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri, and Wisconsin, are attacked as unreasonable, unduly prejudicial in favor of complainant's competitors, and unjustly discriminatory in favor of sand used for other than industrial purposes, and reasonable, non-prejudicial, and non-discriminatory rates for the future are sought.

Docket No. 23897, H. B. Smith Company v. New York, New Haven & Hartford Railroad Company et al., in which the interstate rates on sea (core) sand, in carloads, from Provincetown and Onset, Mass., to Westfield, Mass., are attacked as unreasonable and reasonable rates for the future and reparation are sought.

Docket No. 23930, American Minerals Corporation et al., v. Akron, Canton & Youngstown Railway Company et al., in which the rates on silica, clay and flint, in carloads, from Murphysboro, Elco, Cox, and Olive Branch, Ill., to destinations in official classification territory are attacked as unreasonable and unduly prejudicial of producers of ground silica sand and similar commodities in the Ottawa, Ill., Mapleton, Penn., Hancock-Berkely Springs, W. Va., and other districts, and reasonable and nonprejudicial rates and commodity descriptions for the future are sought.

Docket No. 23936, Whitehead Bros. Co. et al., v. Boston & Albany R. R. et al., in which the rates on sand, in carloads, from points in New York, New Jersey, Pennsylvania and New England to destinations in New England, New York, Pennsylvania, Delaware, New Jersey and Maryland are attacked as unreasonable, and reasonable rates for the future are sought.

Docket No. 23912, Malleable Iron Range Co. v. Ann Arbor R. R. et al., in which the rates on molding sand, in carloads, from Albany, Elnora, and Glenmont, N. Y., to Beaver Dam, Wis., are attacked as unreasonable and reparation only is sought.

Docket No. 23226 (Sub-No. 1), Ayers Mineral Co. et al., v. Aliquippa & Southern R. R. Co. et al., in which the rates on sand, in carloads, from Zanesville, Blissfield, Kent, Glass Rock and Howard, Ohio, to destinations in Maryland, Delaware, New Jersey, New York, New England and Virginia are attacked as unreasonable and reasonable rates for the future are sought.

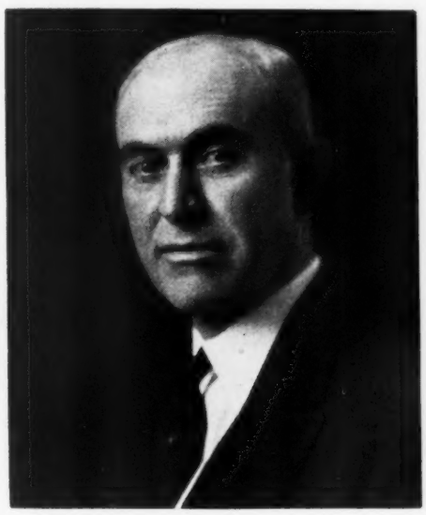
It is understood that the record so far made in these proceedings will be stipulated into the new complaints in so far as pertinent.

The hearing commencing November 21 is for the purpose of receiving the following evidence: (1) Additional direct evidence on behalf of complainants in Nos. 23560, 23796, 23889, 23897, 23930, 23936, 23912, and 23226 (Sub-No. 1). (2) Additional information which other shippers and receivers have agreed to furnish. (3) Such proposals as to commodity description or descriptions, minimum weights, relationships and measure of rates, and origin and destination groupings as (a) the shippers, and (b) the receivers individually or collectively may desire to present. (4) Direct evidence of the carriers, including such proposals as to the above matters as they may desire to present. (5) Rebuttal evidence by shippers and receivers.

C. A. Irvin

CHARLES A. IRVIN, vice-president of the Alpha Portland Cement Co., passed away unexpectedly on Wednesday evening, October 29, at his home in Chicago. As Mr. Irvin had been active and apparently in good health, his sudden death came as a shock to his friends and business associates.

Mr. Irvin was a native of Illinois, having been born in Bloomington in 1873. He became associated with W. F. Cowham and an elder brother, J. S. Irvin,



Charles A. Irvin

when the latter organized the International Portland Cement Co., Ltd., with headquarters at Ottawa, Canada. Mr. Irvin retained connection with that company during the period when it built and put into operation plants at Hull, Quebec and other points in Canada. Subsequently these properties were purchased by the Canada Cement Co., Ltd.

In 1912 the Irvins built the cement plant at Irvin, Wash., a suburb of Spokane, and the operating company, although entirely independent of the Canadian company, became known as the International Portland Cement Co., Ltd. In 1914, Mr. Irvin became vice-president and general manager of that company, making his home in Spokane, where he retained many close friends up to his death. He remained there until 1919, when he came to Chicago to assume the presidency of the LaSalle Cement Co., which was formed at that time to purchase and operate the German-American Portland Cement Works of LaSalle, Ill., then in the hands of the alien enemy custodian.

Later, when the LaSalle Cement Co. was merged with the Alpha Portland Cement Co., Mr. Irvin became a vice-president of the latter and remained in Chicago in charge of the western interests.

Mr. Irvin was active in the affairs of the Portland Cement Association, having served several terms as vice-president and member of the board of directors. He served also on many important committees and attended meetings of the association regularly. His business acquaintanceship was as broad as that of any man in the industry, covering the United States, Canada, and abroad.

Few men acquire the numerous, close friendships for which Mr. Irvin was known. He was a good sportsman and a lover of sports of all kinds. At the time of his death he was president of the Bobolink Country Club of Chicago and a member of numerous other clubs. He exhibited a spirit of fairness in sports as in business which generated confidence; his code of fair play also stamped him as a good citizen, neighbor and friend.

Funeral services were held from the family residence in Chicago on October 31. Many friends accompanied the special train on the Illinois Central Railroad which bore the remains to Bloomington for burial on November 1. Mr. Irvin left a wife and one son, Ward Irvin, who is connected with the local office of the Alpha Portland Cement Co. at Battle Creek, Mich.

Marquette Cement to Build Packing Plant at Vicksburg, Miss.

THE MARQUETTE CEMENT MANUFACTURING Co., Chicago, Ill., with manufacturing plants at LaSalle, Ill., and Cape Girardeau, Mo., and with river terminals at St. Louis, Mo., and Memphis, Tenn., will build a river terminal at Vicksburg, Miss. Clyde M. Tuttle, traffic manager for the company and D. W. Little, chief engineer, who have been in Vicksburg recently, stated that the company will build its largest river terminal in Vicksburg and reship in cars to the entire Mississippi valley.

The company will also ship from Vicksburg by river barge. The cement will be loaded in bulk at the Cape Girardeau plant in 1000-ton barges and at the arrival at the terminal here will be pumped into huge storage silos by the Fuller-Kinyon method. It will be bagged and shipped.

The plant here will consist of several silos constructed of reinforced concrete. These silos are to be 60 ft. in height and 24 ft. in diameter.—*Jackson* (Miss.) *News.*

California Diatomaceous Earth Plant Damaged by Fire

DAMAGE estimated at approximately $175,000 was caused by fire, October 14, at the plant of the Pasatone Diatomaceous Earth Co., Bradley, Calif. The plant will be rebuilt at once on a large scale, according to W. R. Fontaine, of Oakland, and F. A. O'Connell, of San José.—*Paso Robles* (Calif.) *Press.*

William K. Squier

MANY FRIENDS in the gypsum and sand-lime brick industries will be grieved to know of the death of William K. Squier, on October 12, at Syracuse, N. Y. He was one of the older generation of rock products men, who had much to do with placing the industries on the high plane they now enjoy.

He was born at Syracuse, N. Y., on November 15, 1855. He was educated in the schools of Syracuse. As a young man he went to New York, where he was employed by Phelps, Dodge and Co. Returning to Syracuse, he became connected with a retail hardware company.

In 1890 he associated himself with the Paragon Plaster Co., which had been organized in 1888 for the manufacture of hardwall plaster and became one of the pioneers in the field of manufactured gypsum products. He became manager of the company in 1892, building the company from a small beginning to a large manufacturing, wholesaling and retailing organization.

About 1904, Mr. Squier became interested with a number of other men in the plaster field in the formation of the Niagara Gypsum Co., of which he was a director and vice-president for a number of years. In

William K. Squier

1921 he became interested in the formation of the Oakfield Gypsum Products Corp., of which he was the president from the time of its formation until his death.

Mr. Squier was a member of numerous clubs in the city of Syracuse, was greatly interested in trade organizations connected with the gypsum industry and sand-lime brick industry.

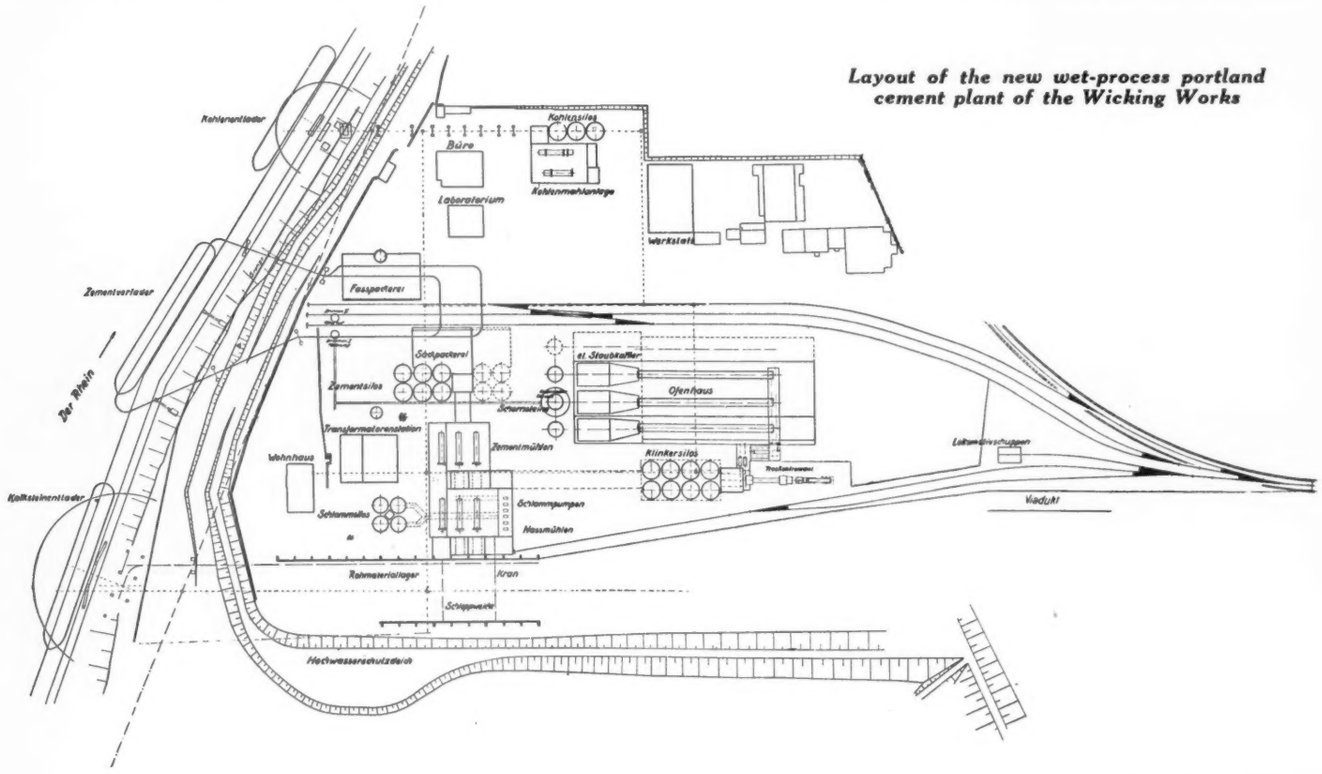
Foreign Abstracts and Patent Review

Internationalization of Alumina Cement Specifications. V. M. Anzlovar refers to Dr. Platzmann's article on internationalization of cement specifications (*Zement*, 1930, No. 3) in which an error has appeared. Platzmann stated that there are two countries in which the alumina cement has been standardized, these countries having only "platonic relations" to alumina cement, that is, not manufacturing alumina cement. These two countries are Holland and Italy. The author is not informed on conditions in Holland, but in Italy there is a plant at Pola (former Austrian fortified seaport) of the Societa Istriana dei Cementi, which has been making an exceptional alumina cement for a couple of years, so that alumina cement has actually become standardized in Italy. Moreover, since the appearance of Dr. Platzmann's article, the Spaniards have included specifications for alumina cement in their new cement specifications, which are superior to the Italian specifications for alumina cement (including also the high-grade portland cements). The author describes the Spanish alumina cement specifications, adding that it is noteworthy that the Spaniards are the first to recognize that the so-called high grade cements, in a special case also the alumina cements, can show the full measure of their high value *only* in their behavior in concrete; they have therefore added the compressive strength test with standardized cubes of concrete. This concrete test should be introduced in other countries as part of the standard cement specifications.—*Zement* (1930) **19**, 40, pp. 942-943.

Rotary Kiln and Waste Heat Boiler. A. B. Helbig criticizes Dr. Steiner's article on rotary kilns and waste-heat boilers (*Tonindustrie-Zeitung*, No. 52) and is then answered by Dr. Steiner. Helbig concludes that in the dry process the use of waste gases is the best possible utilization of heat; in the rotary kiln the waste-gas temperature must be raised to the limit where a sale of the surplus electric power is still possible. In the dry process it must be determined for each case individually whether the use of waste gas at the highest possible waste gas temperature is the correct procedure. A lengthening of the rotary kilns, which are today built in lengths of over 350 ft., is uneconomical, for today it is possible to obtain in kilns of 165-ft. length, due to correct installation of heat exchanging elements, stack temperatures of 300 to 350 deg. C. for slurry of less than 40% water content, during continuous operation at the maximum output of the kiln. It is incorrect to maintain that with a greater heat consumption there appear difficulties in rotary kiln operation or difficulties in the quality of the cement.

On the other side, Dr. Steiner concludes in reference to the utilization of waste heat that the waste-heat boilers are rational, when actually only waste heat is used and the kiln is not operated intentionally to increase the waste heat. A temporary increase in the waste heat can be of advantage, but the economy is impaired. Continual intended increase in the waste gas temperature up to about 1000 to 1100 deg. C. for the purpose of better utilization of the waste-heat boilers would unconditionally be a gross error. For new plants operating with the dry or filtration process the waste-heat boilers can still be counted among the best solutions of the heat management; for the genuine wet process it would not be so easy to decide for the installation of a waste-heat boiler. The cases must be examined individually and not handled generally.—*Tonindustrie-Zeitung* (1930) **54**, 68, pp. 1113-1114.

The Wicking Cement Plant. The various parts of the new wet-process portland cement plant of the Wicking Works at Neuwied on the Rhine are so designed that the maximum production capacity can be doubled without any difficulty and without making alterations. When fully developed, the plant can produce 1500 tons of portland cement daily. This plant represents the most modern and most complete installation of its kind. An electrical dust precipitation



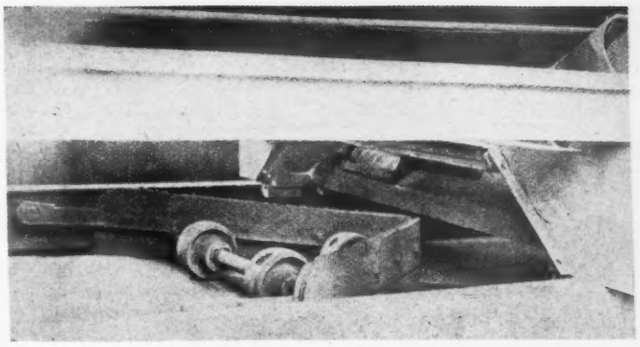
Layout of the new wet-process portland cement plant of the Wicking Works

plant is part of the equipment.—*Baumarkt* (1930) **29**, 35 pp. 1168-1169.

Taking the Color Out of Portland Cement. In this process such substances as, for example, metal halogen compounds, phosphates or borates are added, as, for example, to iron-bearing raw material, which with its coloring constituents, results upon heating in colorless fusions. These fusions occur usually far below the sintering temperature of the clinker, so that the coloring constituents are already fused and can no longer form colored ferrates, or silicates, when the raw materials sinter together. The ivory colored to slightly yellow clinker thus produced is then made into cement. The raw materials can also be fused completely, then granulated, and treated further as customary. The amount of the additive materials, the quantity of which must correspond to the content of coloring substances in the raw material, is so small that the properties of the cement are not affected by them. German Patent No. 500,427.—*Tonindustrie-Zeitung* (1930) **54**, 60, p. 999.

Power and Heat Consumption in Sand-Lime Brick Plants. W. Leder describes in a general way the consumption of power and heat in a sand-lime brick plant, and gives a table of data on the consumption of power and heat in sand-lime brick plants having equipment of various designs and employing various operating methods. These data were obtained in regular operation of the plants. The steam requirement for heating of the pressure cylinders, for driving the steam pumps, for generating power, and for other purposes varies from 474 to 1361 kg. (1000 to 3000 lb.) per 1000 brick of 23x6.5x11 cm. (9x2.7x4.3 in.) size, depending on the equipment and method of the plant.—*Tonindustrie-Zeitung* (1930) **54**, 59, pp. 975-978; 60, pp. 993-995.

New Strike-off for Sand-Handling Belt Conveyors. In the conveying of sand, gravel, etc., by means of belt conveyors it is often demanded to discharge the material at any desirable point of the conveyor. But since the belt sags more or less according to the load, difficulties are encountered in effecting a proper discharge of the material. A new design of discharger or strike-off which is protected by the German Patent No. 489,697, is said to eliminate the difficulties that have been encountered. It has the shape of a plowshare and is made of an elastic material as for example rubber. Three carrying wheels are placed upon two shafts to support the plowshare upon the belt as shown in the accompanying picture.



New strike-off for belt conveyors eliminates difficulties in effecting proper discharge

In order that the strike-off can follow the movements of the belt, it is suspended in the belt conveyor frame in such a way that it always exerts the same pressure upon the belt. The material which piles up against the strike-off, is discharged by aid of special rubber fittings attached to the two arms of the plowshare. A small space is left between the conveyor belt, the bearing wheels and the rubber attachments which prevents a continual scraping of the strike-off upon the belt, but the space is sufficiently small so that the material cannot pass under the strike-off. The strike-off may be provided with two sides to discharge to both sides of the belt; or, it may be provided with one arm striking off either to the right or left side.—*Baumarkt* (1930) **29**, 38, pp. 1319-1320.

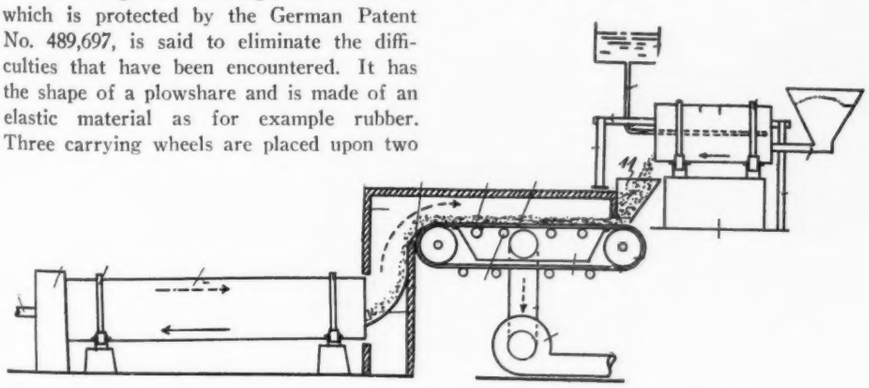
Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Process for Burning Portland Cement. The patentee describes an invention intended to improve the thermal efficiency in burning portland cement in a rotary kiln. Claims are presented that indicate a heating efficiency equal to or greater than that obtained in a shaft kiln and at the same time an improvement in the quality of the cement produced.

The invention consists of an apparatus for utilizing the waste heat from a rotary kiln. The inventor also has found that the time required for burning is dependent to a certain degree upon the size of the granules being burned.

Pulverized raw material is agglomerated in a rotary kiln, and at the same time sprayed with water to form granules, where waste-heat gases pass, causing the granules to dry and partially calcine. This can be done in the upper section of the kiln. The agglomerated material is passed to a second zone in a layer or mass, preferably on a traveling grate, where hot gases are forced through the mass by a suitable fan.



Device for granulating raw material for cement manufacture

By keeping the size of granules down to pea size, the inventor claims a greater ease in burning. He describes several means of keeping the granule size down to his requirements.—*Otto Lellep, Berlin, Germany. U. S. Patent No.* 1,775,313.

Fireproof Building Material. This patent relates to a fireproof building material consisting of pulverized asbestos serpentine rock to which has been added a saturated solution of borax, a certain amount of ground, scrap rubber and sulphur and rosin in sufficient quantity to hold together after baking. Linseed oil is added to make a workable mix after which the material is molded and pressed. The molded object, after treating in an oven at 150 to 350 deg. F., is ready for use.—*Fred Patee, U. S. Patent No.* 1,775,621.

Method of Flowing Pulverized Coal. A newly patented method of rendering powdered coal flowable, like a liquid, heats the powdered coal as it passes from a source of supply to the point of use. The effect of heating is to form gases which drive out air from the voids in the coal and also cause the coal to bulk. The inventor says that the coal may be heated to, say, 200 deg. C. in a suitable receptacle. After this heating it will flow readily by either head pressure or pump pressure. The critical point of heating will of course vary with variations in the distillation point of different coals. He notes that in experimenting with coals there was a marked increase in flowability as soon as the critical point was reached with any coal.

The flowability of any powdered material that gives off gases at a critical point of heating is a well known phenomenon. It can be readily noted in the roasting of sulphide minerals, for example.—*Walter Edward Trent, U. S. Patent No.* 1,758,631.

Colorado Portland Cement Co. to Use Natural Gas at Portland Plant

THAT THE PLANT of the Colorado Portland Cement Co., at Portland, Colo., will be served with natural gas by means of a pipe line from Devine, 10 miles east of Pueblo, was the announcement made recently by F. J. Trlease, district manager for the Colorado Interstate Gas Co.

The line will be started within a short time and will be constructed at an estimated cost of $500,000, according to the announcements. The line, according to the reports, must be completed by March 1.

R. J. Morse, vice-president of the Colorado Portland Cement Co., is quoted as saying that his firm has signed a 15-year contract.

Operations will be resumed at the Portland plant by January 1, it was reported. For the past few weeks, the plant has not been running at capacity, and the resumption of production is expected to start about the first of the year.

It has been estimated that the daily consumption of gas at the Portland plant will be 6,700,000 cu. ft.

While the pipe line construction is in progress the Portland plant will be piped for gas distribution and new equipment will be installed.

The project will follow completion of a $250,000 booster station at Devine on the Amarillo-Denver natural gas line, which will be placed in service within a short time. —*Florence* (Colo.) *Citizen.*

Universal-Atlas Cement to Build Packing Plant at Toledo

TOLEDO, OHIO, will become one of the most important distributing points for cement on the Great Lakes, it was disclosed October 29.

The Universal-Atlas Cement Co., one of the subsidiaries of the United States Steel Corp., is planning to build a new storage terminal and sacking plant at an investment of at least $1,000,000 on the site of the old Hocking Valley coal docks on Front street. This was revealed here to building materials interests by representatives of the company.

Earlier in the year the Huron Portland Cement Co., with its main plant at Alpena, Mich., established a new storage unit and sacking plant on the west side of the river near the Cherry street bridge. The Medusa Cement Co. has one of its most modern plants west of the city at Silica. At least two other large producers have been considering marine facilities here.

Conversion of the Hocking Valley dock for this new use will include construction of large concrete silos for storage of the bulk cement brought in by lake vessels and a sacking plant to pack the product for distribution by truck and rail to the trade served by the Toledo branch plant.

The company represents a merger of the two units in its name consummated last January. It has many cement plants located in various parts of the country and 27 quarries and mines for production of limestone. More than 18,000,000 tons of limestone are produced each year. Some of the cement plants are located on the Great Lakes in the Chicago district and northern Michigan, where water transportation for the finished product is available.

The steel corporation has 76 steam vessels in its Great Lakes fleet hauling coal, iron ore, limestone and other products.

Chesapeake and Ohio railroad officials here could not confirm the sale or lease of the property to this firm, but indicated there were such negotiations under way.

The Sun Oil Co. recently established a pipe line to these docks to provide it with marine facilities.

The dock has room for many vessels and is served by a direct connection with the Toledo Terminal railroad.

Its abandonment by the railroad company was made possible by the construction of the new Presque Isle terminal of the Chesapeake and Ohio lines. It probably will be next spring before the dismantling of the coal docks will get under way and construction of the new cement terminal started.—*Toledo* (Ohio) *Times.*

Mississippi Gravel Companies Combine

THE PLANT of the Hattiesburg Gravel and Sand Co., Hattiesburg, Miss., recently acquired by the American Sand and Gravel Co. and J. J. Haney, Hattiesburg, is now being operated as the Hattiesburg Gravel Co., Inc.

The plant has been remodeled and now has a capacity of 30 to 40 cars a day. Holdings of the company include 600 acres of gravel and sand bearing lands.

Acquisition of this plant gives the American Sand and Gravel Co. a daily capacity of 60 to 80 cars, approximately doubling the former capacity. S. O. Trest is superintendent of both plants.

Herbert Gillis, secretary-treasurer of the American Sand and Gravel Co., has been named president of the Hattiesburg Gravel Supply Co. S. O. Trest is vice-president; J. J. Haney, secretary and W. B. Thigpen, Jr., treasurer.

Mexican Cement Plant Active

IN ORDER to supply the increased demand for cement for highway construction and other building operations, the Monterrey Portland Cement Co. is doubling the capacity of its plant. When the addition is completed, its production will be approximately 2000 tons of cement daily. The cost of the improvements will be 750,000 pesos, equivalent to $375,000 United States money.

Distinguished British Cement Manufacturer Visits British Columbia

BRIGADIER-GENERAL ALFRED C. CRITCHLEY, C. M. G., D. S. O., Canadian soldier now allied with the British cement manufacturing industry, arrived in Victoria, B. C., recently. He was met following his arrival at the Empress hotel by Edwin Tomlin of the British Columbia Portland Cement Co. and taken to Bamberton to inspect the cement plant there.

It was in 1923, after carrying out colonization and development works in Mexico and Central America, that General Critchley returned to England to take an active part in the cement industry of Great Britain. He joined the board of the Associated and British Portland Cement Manufacturing corporations and became vice-president of the British Portland Cement Association.

General Critchley is the man who in 1926 organized greyhound racing in England and he built and operated the first greyhound race track in Great Britain at Manchester.

By reason of his activity in popularizing the sport of greyhound racing he was made vice-chairman of the Greyhound Racing Association Ltd., and its affiliated companies.

A native of Calgary, General Critchley was identified with the commissioning of Lord Strathcona's Horse. At the outbreak of the European war he crossed to France with the First Canadian Division as adjutant of Strathcona's Horse. He was attached to the First and Third Canadian Divisions and also the general staff.

Early in 1918 he was transferred to the Royal Flying Corps from the Canadian forces. He went to the reserve of officers, Canadian forces, in June, 1919. He was awarded the D. S. O. in 1916 and the C. M. G. in 1919.

It was in the post-war period that he made a study of Mexico and the countries of Central America, putting through extensive development and colonization work there.—*Victoria* (B. C.) *Times.*

Cement Now Shipped by Boat from San Francisco to Long Beach, Calif.

CEMENT will begin to move soon over the new Long Beach Municipal Wharf and the transit shed, it was announced by the Harbor Department. The first consignment of cement in sacks was due to arrrive the latter part of October from San Francisco and thereafter other consignments will come every two weeks for a while.

The cement is to be used on the State Highway construction just south of Long Beach. The first cargo of 3000 sacks, consigned to Zimmerman Brothers of Long Beach, was due in on the steamer *Munami* of the McCormick line and will be placed in the shed and then hauled away as needed.—*Long Beach* (Calif.) *Press-Telegram.*

The Berkeley plant of the North American Cement Corp. turned out in force for its celebration despite unpleasant weather

North American Cement Corporation Plants Celebrate No Accident Year

By A. R. Couchman
Safety Director

WE OF THE NORTH AMERICAN Cement Corp. are enjoying, for the first time in the history of our organization, 365 consecutive days without even a lost time accident, in three of our plants. While the number of lost time mishaps has been steadily decreasing in our mills during the past five years, we never had any of our mills complete an accident-free year until recently.

Sometimes just one or two accidents would stand between us and a year's perfect record, and some of our mills were almost convinced that we were then doing our best and that an accident or two always could be blamed on the element of luck. However, after reorganizing our safety forces we have learned more about minimizing both accident frequency and severity and now look back with satisfaction to the progress of the past year.

Recalling some of the problems that seemed almost impossible of solution, we have not only solved them but we know that what has been accomplished can be repeated.

It was two years ago that we reorganized the safety work in our mills. At that time we made accident prevention a part of our operating program. The system employed in controlling cost, quality and production was installed in connection with the safety work. The following fundamental factors contributed materially to the success of this work, all of them now being "standard procedure" in our mills, which means that they are compulsory regulations:

(1) All injuries and near injuries, regardless of how insignificant they may seem, are reported for treatment.

(2) Written reports are made on all injuries and near injuries.

(3) All injuries and near injuries are carefully investigated and studied and the results are made known to all.

(4) Every employe is required to possess and wear goggles where specified.

(5) All employes are given first-aid training.

(6) Protective clothing and devices are used as specified.

(7) Weekly and semi-monthly departmental mass meetings are held, being conducted by department heads and foremen.

(8) The safety program includes regular inspections of plant housekeeping.

(9) Weekly safety and fire inspections are conducted.

(10) Safety advertising and publicity are provided in connection with bulletin boards and plant publications.

The above features have been the basis of our safety activities during the past two years. Our accomplishments have been far reaching not only in making a

The safety committee of the Howes Cave North American plant. Front row, left to right: Harry Greenwald, chemist; W. F. Johnson, master mechanic; Louise Scrom, secretary, safety committee; T. E. Miller, quarry foreman; R. H. Young, safety director. Back row: J. W. Campbell, superintendent; S. H. Rhodes, plant engineer; M. Hunt, relief foreman; L. Wood, repairman; Charles Bailey, general foreman; M. Wieland, repairman; W. Rockwell, repairman; Ira Guernsey, repairman; C. M. Martell, electrician; H. L. Richards, night foreman

The North American interplant safety trophy, which was won by Berkeley in 1926; Catskill, 1927 and 1928, and Berkeley, 1929

good record but our employes are acquiring safe habits.

As a result of continuous effort, our Berkeley lime plant located at Martinsburg, W. Va., celebrated its first year without accidents on July 23, 1930; our Security cement plant located at Hagerstown, Md., celebrated its first accident-free year on August 8, 1930, and our Howes Cave, New York, cement plant attained similar distinction on October 4, 1930.

Berkeley Celebration

At our Berkeley plant celebration approximately 400 employes and their families assembled at the plant office where the program was held and heard W. L. Stevens, of the Baltimore and Ohio Railroad Co., as the principal speaker. Officials of the North American and representatives from the executive office also talked including John J. Porter, vice-president and general manager; A. M. Tyree, general purchasing agent, and E. F. Alderton, superintendent at the Berkeley. The writer acted as master of ceremonies. Following the speaking an interplant first-aid contest was held. The Berkeley plant team was awarded first honors. After the program everybody participated in a delicious luncheon, served by members of the first-aid team.

At Hagerstown Plant

The safety celebration at Hagerstown, Md., plant took place in the park adjoining the plant, where employes and their families were assembled around the concrete base which has been erected for the Portland Cement Association safety trophy. This base served as the speakers' platform. Mr. Porter and John F. Gruber, district sales manager, were the speakers of the occasion. Other executives present were E. S. Guth, district manager; W. C. Brownson, district sales manager, and Mr. Alderton. After the ceremonies, refreshments were served by members of the safety committee.

Howes Cave Ceremonies

Three hundred employes and their families together with a large number of officials assembled at the Howes Cave plant on October 4, marking the completion of the 365th consecutive day without a lost time accident at the plant.

The occasion took the form of a meeting in front of the plant office where Hon. H. M. Greenwald of the company's chemical department, acting as master of ceremonies, introduced F. W. Kelley, president, Mr. Porter, the writer and J. J. Long, safety supervisor for the Delaware and Hudson Railroad, and recently elected vice-president of the National Safety Council. Other visiting executives included: C. R. Parks, treasurer; G. A. Witte, assistant general manager; A. M. Tyree, general purchasing agent; E. K. Miller, auditor, and W. J. Fullerton, engineer.

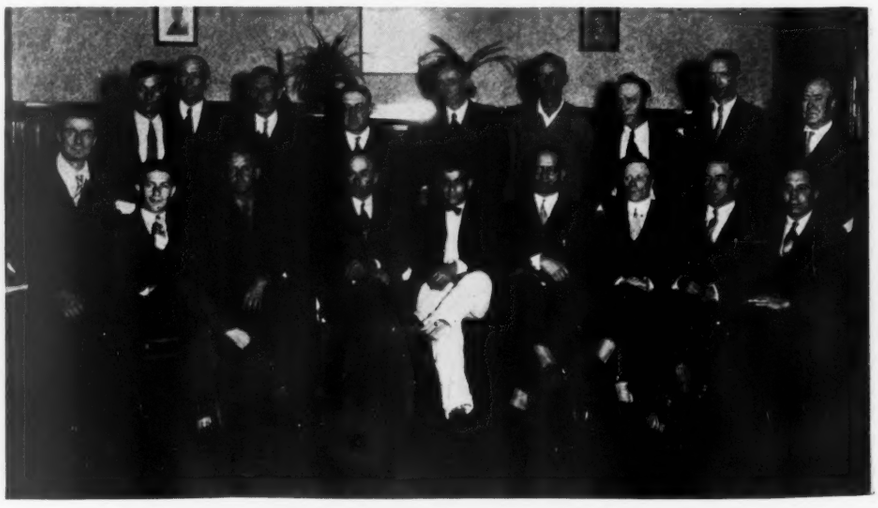
It was a day of considerable enthusiasm and pride at the accomplishment in the way of safety and Superintendent John W. Campbell, together with Raymond Young, chairman of the local safety committee; H. M. Greenwald, chairman of the program committee; and S. H. Rhodes, chairman of the refreshment committee, were the recipients of congratulations by the officials for the fine record and program. A fine lunch followed.

Eliminating Accidents at the Plant of Superior Portland Cement, Inc., Concrete, Wash.

By H. A. Ambler
Superintendent and Chief Chemist

FOR A NUMBER OF YEARS the pioneers in safety work at the Superior Portland Cement, Inc., Concrete, Wash., had a discouraging time of it, for, in spite of their best efforts, the accident toll remained unchanged. The ground work for effective accident prevention was being laid, however, and as the management became increasingly interested and gave its active and unreserved support to the work, real progress was noted. Education of the workmen in safety ideas was painfully slow at first, but gradually these ideas were accepted by more and more of the employes, until at last every employe became convinced of the value of accident prevention.

Accompanying this growth of the safety idea there was a sharp reduction in the number of lost-time accidents. Active accident prevention work was initiated in 1925, and during the succeeding two years we experienced 30 lost-time accidents per year. For the next three years the number of lost-time accidents was reduced to four per year,



The safety committee at Superior at a recent meeting held in the Clinker Club at Concrete, Wash.

This shield was devised by an employe of the Superior Portland Cement, Inc., for protecting the eyes of packers from "shots" of dust

while this year to date we have suffered only one lost-time accident.

It is mandatory that employes report every accident, however slight, in order that the foreman may judge the necessity for medical attention, and our greatest encouragement comes from the progressive reduction in the total of our minor, lost-time and fatal accidents. In 1928 this total was 104; in 1929 it was 67; while during the first nine months of 1930 only 23 accidents have been reported, including one lost-time accident. From these results we believe our methods to be correct, and we are convinced that they must result in the continued reduction and eventual elimination of all accidents.

Unfortunately the lower accident frequency rating was not accompanied by a proportionally lower accident severity rating, and the task of lowering the severity rating has become the major problem of the safety committee. Assured that the more obvious hazards have been eliminated by education and proper safeguards, this committee is devoting the most of its efforts toward the detection and elimination of obscure hazards and unsafe practices. In addition to this work, the safety committee has the equally important task of keeping the thought of safety in the minds of the employes.

Safety inspectors supplement the regular committee for the detection of hazards and unsafe practices. Three inspectors are appointed each month from among the workmen and time is allowed for each one to make a complete safety inspection of the mill and quarry.

Their reports are submitted to the committee at a safety dinner held at the end of the month, and these reports have been of great value in our work. It has been a common experience that severe or fatal accidents do not usually occur at a point where the danger is obvious, for at those points more care is automatically observed, and the main value of the safety inspections lies in the detection of the obscure hazards.

Safeguarding is essential, and new safeguards are always of interest to the safety worker. Our packing machines presented a serious hazard, for we found that the packers were having an average of 26 eye injuries per year, and while fortunately none of the injuries were severe, yet each was a potential lost-time accident. In the early part of 1929 we installed a patented dust shield on our packing machines, and since these shields have been in use the packers have not suffered a single eye injury from flying cement. Further, the constant fear of an injury had been slowing up the work, for it was found that the production increased 17% after the installation of the shields.

Bonus pay envelope used by Superior Portland Cement, Inc., to carry the safety message home to the family

A steady enthusiasm for safety is essential, and the thought of safety must ever be uppermost in the workman's mind if the campaign is to be a success. The consequences of accidents are impressed on men by first aid training and men trained in first aid not only work more carefully but can be counted on to warn their fellow employes of unsafe practices.

We attribute a large measure of our success in reducing accidents to the 100% first aid training given our employes by the United States Bureau of Mines. Safety rallies are valuable, as they reach not only the workmen but their families as well.

As a feature of our safety rallies we offer prizes to the school children for the best essay on an assigned safety subject. This not only interests the children in the safety movement, but carries the thought of safety into the home, for most of the material for the essays has to be obtained from the parents. However, the enthusiasm of safety rallies soon wears off, and we have found that they must be supplemented by daily reminders.

The idea of safety must be constantly advertised, and every means must be used to keep the thought of safety before the men. For this purpose we use bulletin boards, signs, posters, safety whistles and, most important of all, have the foreman always on the alert to detect unsafe practices in his department.

At least once a month, and oftener if necessary, the foreman takes time to talk to each of his men on safety, not only to solicit suggestions, but to remind them that safe working pays. Bulletin boards are valuable only if the posters are frequently changed, and the posters must be accompanied by

items of national or local interest in order to draw attention to the board. We also advertise the first accident of each month, whether this be a lost-time accident or not, by mailing to each employe a mimeographed letter giving all the details of the accident, together with suggestions for avoiding a similar occurrence.

But our most effective reminder is the bonus which is paid at the end of each month. Under this system, which was adopted in 1929, each employe receives $1 a month, provided there have been no lost-time accidents during the month. The bonus is not merely added to the monthly pay, but is enclosed in a special envelop attached to the pay check, so that the maximum amount of safety advertising may be derived from it.

The value of the bonus lines in the fact that it makes each man his brother's keeper so far as safety is concerned, and sorry indeed is the man whose carelessness or thoughtlessness causes the bonus to be omitted. The bonus has a further value in that many of the employes turn the bonus over to their children, and the reminders that they receive at home are frequent and forceful.

Minor accidents are potential lost-time accidents, for if the hazard is there the severity of the accident that must ultimately occur is governed by good fortune. We therefore are giving careful study to our minor accidents that we may eliminate those obscure hazards that eventually cause a lost-time accident. We believe that this study, together with the educational and advertising features of our safety program, will give us that greatly desired result, a perfect accident record.

FIVE-YEAR LOST-TIME ACCIDENT RECORD AT SUPERIOR PORTLAND CEMENT, INC.

	1926	1927	1928	1929	1930
Quarry	11	5	....	4	....
Crushing	....	....	....	....	....
Raw	7	....	1	....	1
Burning	....	....	....	....	....
Finishing	4	....	....	....	....
Coal grinding	1	....	....	....	....
Cement storage	3	....	....	....	....
Pack and ship	....	....	....	....	....
Power	2	....	....	....	....
Shops	1	....	....	1	....
Railroad (outside quarry)	....	....	....	....	....
Yard	4	....	....	1	....
Clay storage	1	....	....	....	....
Coal storage	1	....	....	....	....
Store room	1	....	....	....	....
Survey camp	....	1	....	....	....
Laboratory	....	....	1	....	....
Total	36	6	2	6	1

Lehigh Cement Organization at Birmingham, Ala., Works for Public Safety

DECISION to conduct an educational campaign on the meaning of the amber light in traffic signals and formulation of plans for participation in the Armistice Day parade featured a luncheon-meeting of the executive committee of the Birmingham Safety Council in Tarrant City recently as guest of the Lehigh Portland Cement Co.

The luncheon followed inspection of the Lehigh plant at Tarrant by the committee, the second of a series of meetings with member companies inaugurated by F. B. Winslow, council president. R. H. MacFetridge, vice-president of the council and superintendent of the Lehigh plant, played host. Lunch was served by the Order of the Eastern Star in Tarrant Masonic hall.

The council plans to devote its white way light poster board space to the subject for the entire month, beginning November 20, and to carry on a campaign through the press and over the radio throughout the period.

Reports were made on Birmingham's low automobile accident mortality rate, the status of the uniform vehicle code, which, with the Alabama League of Municipalities, the council sponsored in the last legislature and which it is planning to back again; activities of Fire Prevention Week, just closed; the recently concluded National Safety Congress in Pittsburgh, and the Armistice Day parade.

The report concerning Birmingham's automobile death rate showed that for the 52 weeks ending October 4, 1930, Birmingham's rate was lower than 22 cities of 31 named, and the lowest of all 31 for the 52 weeks ending October 5, 1929.

In discussing the Armistice Day plans, it was decided to present all three phases of the council's work—public, home and industrial.

During inspection of the plant, committee members were reminded by safety bulletins that the mill was operating its 705th day without a lost-time accident.—*Birmingham* (Ala.) *News.*

The three crack teams of California cementdom as they looked during the third California safety meeting. From left to right, Santa Cruz Portland Cement Co., which finished second in the meeting's first-aid contest; Cowell Portland Cement Co., third place, and the Redwood City team of the Pacific Portland Cement Co.

Safety Code for Pulverized Fuel Installations

A REVISION of the American Standard "Safety Code for the Installation of Pulverized Fuel Systems" is announced by the American Standards Association. The rapid increase in the use of pulverized fuel in many industries, resulting in new developments in methods and design of equipment, is responsible for the revision. The original code was approved by the American Standards Association in 1927.

The code covers the construction of buildings housing fuel pulverizing equipment, the ventilation of these buildings and specifications for dust collection systems. Specifications are given covering methods of preventing explosions through static, through the drying of coal and through its transportation through pipe lines. The code also contains suggestions for safe operating rules to be printed on instruction cards which can be used for guidance of the employes in charge of the operation of such systems.

Copies of the code are available for 5 cents each from the American Standards Association, 29 West 39th street, New York City.

Tennessee Exhibit Promotes Sale of Agricultural Limestone

"MASCOT" LIMESTONE, prepared by the American Limestone Co., of Knoxville, Tenn., had an attractive booth in the steel building at the South Carolina State Fair grounds, Columbia. The booth, decorated with green crepe paper, consisted of various signs, one of which was a revolving electric sign, setting forth some of the qualities of the Mascot brand. "Mascot is standard magnesium agricultural limestone. The uniform fineness of Mascot makes light applications effective," the sign read.

In addition to the display in the steel building, the company had in a cattle barn a herd of 16 Aberdeen Angus cattle, raised on a farm connected with the plant.

O. H. Stannard, of Columbia, is the state representative of the company.—*Columbia* (S. C.) *State.*

Ohio Contract Prices of Rock Products

JERSEY TOWNSHIP, LICKING COUNTY, OHIO—Thomas and Brooks, Centerburg, Ohio, awarded contract for 427 cu. yd. of gravel placed on highway for $745.25 ($1.74 per cu. yd.).

CARDINGTON, MORROW COUNTY, OHIO—Contracts for placing stone on two highways awarded as follows: The Kilbourne-Cardington-Hunt road, 3½ miles of traffic-bound macadam, in Westfield, Lincoln and Cardington townships, was awarded to W. A. Lutz, Bucyrus, at a bid of $8337.84. Total cost of the road will be $9578.59, or 18½% less than estimate.

The Cardington-Chesterville road in Harmony and Lincoln townships, two miles of traffic-bound macadam construction, was awarded to Kersting and Mayor, of Ottawa, at a bid of $4942.03 for the stone. Total cost is $5660.58, or 17½% under estimate.

PORTSMOUTH, OHIO—Bids for two carloads of portland cement for use by the city were: Horr Bros., $2.14 per bbl.; Portsmouth Cement and Lime Co., $2.15 per bbl., and Harsha Milling Co., $2.17 per bbl. Horr Bros. were awarded the contract.

IRONTON, OHIO—Contracts for more than 3750 cu. yd. of road improvement material—limestone and washed gravel—at a cost of $3172.50 were signed during the last week in October by the Lawrence county board of commissioners.

Of the material purchased 1200 cu. yd. of it is for limestone while the balance is for washed gravel. Contractors who received the limestone contracts are to have their contracts fulfilled by December 31, while those receiving gravel contracts are to be finished with their work by November 20.

Most of the contracts were small, ranging in the vicinity of 300 cu. yd. The smallest called for 250 cu. yd.

Contracts were awarded as follows:

Herbert Woolum of Waterloo, 300 cu. yd. of limestone at $1.24½ per cu. yd., placed in pile on newly graded road on the Cauley Creek road.

Carl Roberts of Waterloo, 300 cu. yd. of limestone on Buffalo-Waterloo road, in pile at its intersection with Waterloo-Mt. Vernon road, at $0.98 per cu. yd.

William Coffman of Sherritts, 300 cu. yd. of limestone at $0.97, in pile on Tick Ridge road near Laymon Burd's place.

Cecil and Carlos Reed, Kitts Hill, 300 cu. yd. of limestone, in pile on Sharps Creek road near Noah Jenkins, at $1.25 per cu. yd.

A. J. Mann of North Kenova, 300 cu. yd. of washed river gravel at $0.75, placed on Little Buffalo road from Low Gap to Mount Pleasant church.

Jess Reed of Scottown, 300 cu. yd. of washed river gravel at $0.69, on branch of Little Buffalo Creek road, from Low Gap to the left.

W. M. Whaley of North Kenova, 300 cu. yd. of washed river gravel at $0.49, on Big Branch road.

Carter Massie of Greasy Ridge, 400 cu. yd. of washed river gravel at $0.60, on Big Bear Creek road.

Clyde Petrie of Proctorville, 250 cu. yd. of washed river gravel at $0.52, on the new grade of Bent Creek road.

Crate Willis of Kitts Hill, 1000 tons of washed gravel at $0.89, on Little Pine Creek road.

New Houston, Tex., Gravel Project Reported

A 400-ACRE GRAVEL pit, 27 miles north of Spring, Tex., will be opened soon by the Howard Kenyon Dredging Co. of Houston, which has a long-time lease on the property, Howard Kenyon said recently.

Mr. Kenyon said that his concern is planning to build a 5½-mile standard gage railway from the I.-G. N. railway at Fetzer to the property.

He said the gravel is 80%, small in size and the equal of that found in Louisiana. The gravel depth is from 14 to 32 ft.

Mr. Kenyon said the Warren Central Railway Co.'s 20-mile railway from Katy to the Hockley salt mines will be in operation within 90 days. He said that considerable grading has been done, and work of laying rails will start soon. Sidings to hold ties, rails and other materials will be built first at Katy and then work will follow on th main line. This will cost about $500,000.

Ohio Power Company Proposes New Rate Basis

THE COLUMBUS, DELAWARE AND MARION ELECTRIC Co. recently asked the Ohio Utilities Commission to approve a revised rate schedule affecting its larger power users.

The schedule provides for a fluctuating rate based on the price of coal. If the commission approves the rate schedule, it will be available to firms which will guarantee to use 10,000 kw.h. per month and who will contract for a term sufficient to protect the property investment of the company.

Several crushed-stone and lime companies are numbered among the power company's customers.—*Delaware* (Ohio) *Gazette.*

New Phosphate Rock Plant for Idaho

THE Idaho American Fertilizer Co., a $25,000 Idaho corporation, is putting in a fertilizer plant in Parma, Idaho, on a site purchased from the S. W. Morrison Lumber Co. in the west end of town along the railroad right-of-way. The building, which is now under construction, will be 40x50 ft.

Harry Jackson, president of the company, stated that the product to be manufactured is a phosphatic fertilizer and will be made principally out of an Idaho raw product mined in Bear Lake county at Paris.

Maine Gravel Company Wins Tax Suit

A SECOND LEGAL ATTEMPT by selectmen to collect taxes from a Portland, Maine, concern operating extensive gravel banks within the town of Leeds met defeat when Justice Chapman directed a verdict for the defense in the action known as Linwood S. Grant vs. Maine Sand and Gravel Co. in the superior court at Lewiston, Maine, recently.

In a prior action the gravel concern, then known as Maine Crushed Rock and Gravel Co., successfully refused payment of 1926 and 1927 taxes when the courts held machinery such as the Portland concern operated in Leeds and the nature of the business did not allow its taxation by the town.

Thereupon Leeds selectmen, in their office as assessors, classified so much of the machinery as was attached to the ground by concrete foundation, as real estate, along with the 50 acres of land and two small buildings. This the Maine Sand and Gravel Co. refused to pay for the years 1928 and 1929.

As the tax deed period for each year occurred the tax collector bid off the taxes and in each case the town itself was the purchaser of this lien on the property. The defense held that, in so far as the tax collector was concerned, he had received the 1928 and 1929 taxes on the property and it was in support of this contention that Justice Chapman directed a verdict.—*Lewiston* (Maine) *Journal.*

Long Island Gravel Company Enjoined

SUPREME COURT JUSTICE NORMAN S. DIKE, in Brooklyn, N. Y., recently granted to the village of Asharoken, Suffolk county, a temporary injunction restraining the Metropolitan Sand and Gravel Co. from proceeding with the construction of a 1000-ft. jetty extending into the water at the eastern side of the village.

Paul Grout, as attorney for the village, contended that the construction violated the zoning regulations and that the action of the water would change the shore line.

The court, in granting the temporary injunction pending trial of the action for a permanent injunction, directed the village to post a bond of $50,000.—*New York* (N.Y.) *News.*

Ohio Sand Deposit at $300 Per Acre

THE WALSH CONSTRUCTION CO. has bought the Erle Alexander sand hill in the east part of the county to supply material for the fill at the overhead crossing of the New York Central lines at Moline, Ohio. It is understood the price is around $300 per acre.—*Bowling Green* (Ohio) *News.*

Pertinent Paragraphs

¶

Interesting items from everywhere condensed and "abstracted" for the benefit of busy readers

By Hugh Sharp

AL WEIGEL, the versatile lime plant engineer from Woodville, Ohio, saves Pert Paragraphs oodles of work this issue by coming to bat with his conception of a stone age lime plant. As most of you know, Al is associated with Arnold and Weigel, Inc., contractors and engineers. His talent for drawing and cartooning is well known. Friends receiving Christmas cards from Al Weigel never throw them away. They are the talk of the trade. Some time when you are in the vicinity of Woodville have Al display his superb collection of unusual art work.

~ ~ ~

THE SUCCESSFUL use of radio in maintaining communication between the ends of freight trains, sometimes more than a mile in length, makes one ponder over the possibilities of this method of wireless interchange of messages as a practical thing in the control of extensive quarry operations.

~ ~ ~

A YOUNG FARMER at Lime City, Iowa, is conducting a profitable business from the sale of old limestone reclaimed from a five-kiln plant abandoned 30 years ago. He gets $4 a truck load from farmers in the vicinity.

~ ~ ~

SOME IDEA of the extent to which the Universal Atlas Cement Co. plant at Hannibal, Mo., emphasizes its safety first program can be gained from a glance at the last monthly report. One hospital case is listed as "stung by a wasp." This plant is well equipped against accidents, and while the "stung by a wasp" may seem a little extreme, it is well to note the general policy in force—*No scratch or abrasion, no matter how small, shall go unattended.* Perhaps other companies could profit by paying attention to small accidents BEFORE they develop into big ones.

~ ~ ~

QUARRY MANAGEMENT is becoming a highly specialized profession in England. The Institute of Quarrying has arranged for a course of study at the Imperial College of Science and Technology, London University, for young men who aim to become quarry managers.

THE WORLD'S tallest all-welded steel construction building is the new 19-storied office building of the Dallas (Texas) Power and Light Co.

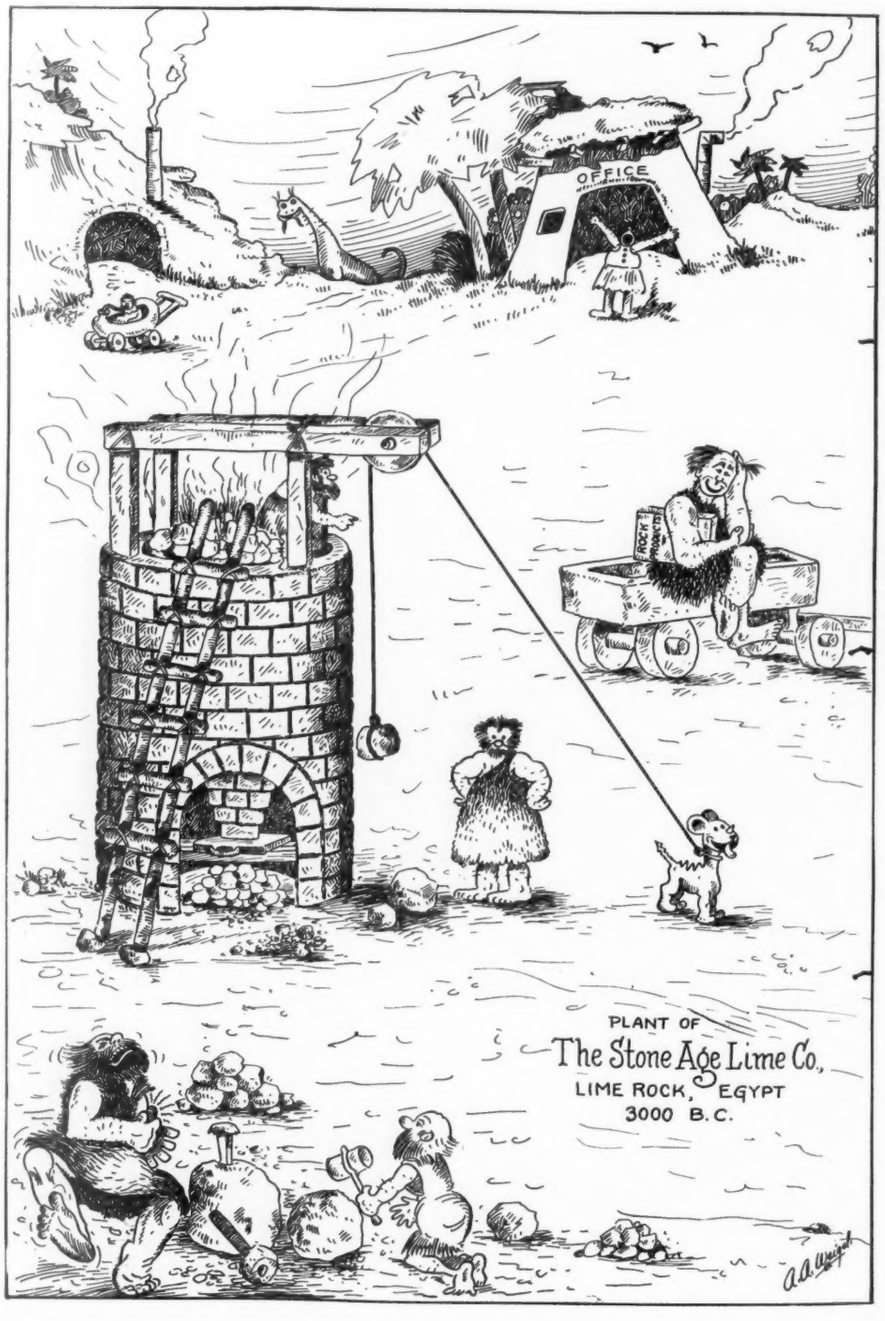
SIGNIFICANT of the trend of highway construction is the 350-ft. highway specification announced by the state of New Jersey for a nine-tenths mile stretch which will accommodate 35 lanes of traffic.

~ ~ ~

SOME 10,000 concrete piles, 47 ft. by 14 in. by 14 in., driven 12 days after casting, support the new English factory being built by Henry Ford at Dagenham and said to be the largest automobile plant in Europe.

~ ~ ~

NEW BUILDING construction in California in the month of September exceeded August of this year and September of 1929, according to Melville Dozier, Jr., manager of the Southern California Chapter of the Associated General Contractors.



Ohio Contractor's Substitution of Sandstone for Concrete Curb Illegal

AN ILLEGAL PAYMENT of $8090.50 was made to the Cleveland Trinidad Paving Co. by the village of Mayfield Heights, Ohio, for putting in curbing on Sunset road, State Examiner L. Rupert found after an investigation of village contracts.

The Trinidad company contracted with the village to use concrete curbing on Sunset road at a cost of 50 cents a foot.

Instead of concrete, the contractor used sandstone curbing at $1.10 a foot, raising the price 60 cents a foot above that agreed to under the contract.

Mr. Rupert said that investigation showed no supplementary contract authorizing the change to the more expensive sandstone, and declared the payment illegal.—*Cleveland* (Ohio) *Press.*

Plan for Louisville, Ky., City Quarry Dropped

FAY H. MARVIN, director of welfare, Louisville, Ky., has dropped the plan to operate a quarry on the Prospect car line near Pipe Line Lane for workhouse prisoners after studying an injunction that shut it down last year.

John D. Clausen, attorney, who was granted the injunction, protested when he learned of the city's intention to start work. Mr. Marvin said terms of the injunction were such as to forbid ordinary quarry operations. The lease from R. T. Colston, quarry owner, stipulated payment only on removal of rock.

Mr. Marvin is working on a new plan to keep workhouse prisoners busy. He has located a site of 200 acres near the Oldham county line that could serve as a combination farm and quarry. The chief drawback is that it requres a $20,000 investment. The land lies near a railroad switch and Mr. Marvin said it could produce vegetables for city institutions as well as rock for street construction.—*Louisville* (Ky.) *Times.*

Memphis Cast-Stone Plant Changes Ownership

THE LOEB STONE CO.'s plant at 860 South Bellevue boulevard, on the N., C. & St. L. railroad, Memphis, Tenn., was sold recently to the Hydro-Stone Co., a new corporation controlled by W. J. Martin, Ralph Bodman and Miss M. F. Huffman.

The plant, purchased from Henry Loeb, II, will resume production next week with a crew of 25 men. The company has the contract for the cast stone work for the new addition to Western State hospital at Bolivar and a government construction contract in Texas.

Mr. Martin, who is president of the company, has been 15 years in the production end of the cast stone business in Chicago and was previously a construction superintendent. Mr. Bodman, a native of Memphis, who is vice-president in charge of sales, is a graduate of the Tulane University School of Architecture and has had seven years' architectural experience in New York and the South.—*Memphis* (Tenn.) *Commercial Appeal.*

California Crushed Stone Company to Operate Gravel Plant

RUMORS of several months ago that the Basalt Rock Co., of Napa, Calif., was seeking a site for sand and gravel operations on the Russian river near Healdsburg have been confirmed here with the filing of a deed to 5.05 acres on the river bank, acquired by the company from Marguerite M. Weber, Lela M. Redrick and Gladys V. Dahlquist. The price involved in the deal is not mentioned.

The site acquired by the Basalt Rock Co. is just above the Grant properties, but on the opposite side of the river, off the Fitch Mountain road, directly east of Healdsburg.

Under the terms of the deed granted the Napa company, the grantors reserve their riparian rights to water from the Russian river for use on their remaining lands.—*Santa Rosa* (Calif.) *Press-Democrat.*

Colorado Steel Activity Increases Limestone Demand

ANNOUNCEMENT was made recently by officers of the Colorado Fuel and Iron Co. that its activities in Colorado and Wyoming would be increased at once.

W. A. Maxwell, Jr., vice-president of the company, said the rail mill would be reopened to roll the Union Pacific and Santa Fe orders. Seven more hearth furnaces are to start, bringing the total of furnaces heating metal to 11. Shipments of limestone from the Monarch quarry near Salida were to be increased November 1.

New Plaster on Market in Milwaukee

A NEW PRODUCT, a permanent plaster wall finish that may be applied over the old walls, cracks, spots and peeled surfaces leaving the finished walls looking as good as new, is being marketed by the Artex Products Corp., 2611 Fond du Lac avenue, Milwaukee, Wis. Houghton Brown, Jr., is in charge of local operations. Mr. Brown stated that the product is also applied in new construction directly over the brown or scratched finish. Many types of wall and stone effects can be accurately reproduced with this substance.—*Milwaukee* (Wis.) *News.*

Illinois Agricultural Limestone Consumption Down About 25%

ILLINOIS FARMERS will use approximately 70 to 75% as much agricultural limestone for soil improvements in 1930 as they used in the record year of 1929, according to an estimate based on shipments from quarries during the first nine months by J. R. Bent, of the Illinois Agricultural Association. Last year a total of 925,000 tons was spread on Illinois farms, a record not only for this state but also for the entire country.

These figures indicated that Illinois is holding steadfastly to the permanent system of soil fertility based on the use of limestone, legumes, and ground rock phosphate.

Twenty-seven quarries have contracted with the Illinois Agricultural Association to supply agricultural limestone in 1930 compared with 22 in 1929. The quarries are located in Illinois, Indiana, Iowa and Missouri.

New Crushed Stone Plant in New Jersey

IT HAS BEEN REPORTED that a new crushed stone plant is to be built near Bogota, N. J., by Geo. M. Brewster and Son, Inc. The plant will be more or less of a temporary plant and therefore to be of wood construction. The Burrell Engineering and Construction Co. of Chicago, Ill., is the designer of this plant which will have a capacity of 225 tons of crushed stone per hour. The plant will operate dry, using a Farrel-Bacon jaw crusher as a primary unit and a 5½-ft. Symons cone crusher for a secondary crusher. The finishing crushing will be done by a 48-in. Newhouse crusher. Robins Gyrex vibrating screens will be used for both scalping and for final classification. The plant is expected to be in operation some time during the early spring of the coming year.

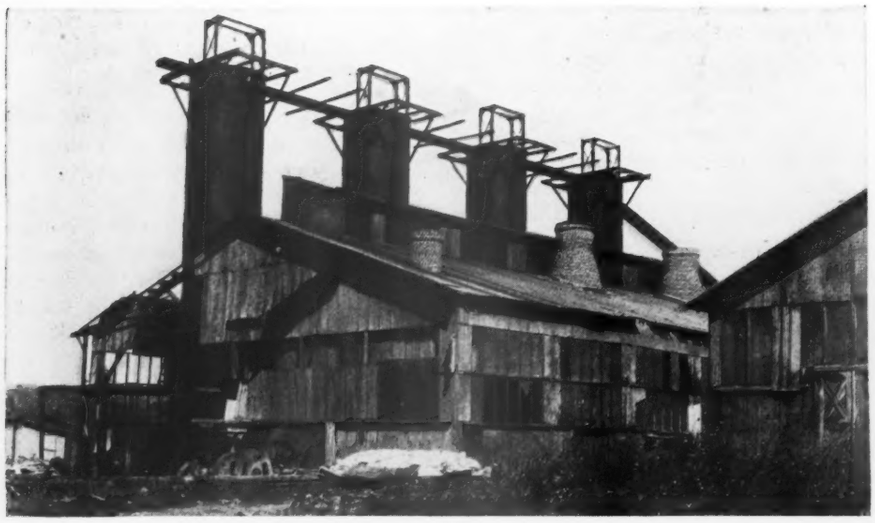
Federal Cement Tile Co. Expands

THE FEDERAL CEMENT TILE CO., of Chicago, Ill., announces that it has acquired the American Cement Tile Manufacturing Co.

Executive and general offices will be at Chicago, with additional sales offices in New York, Philadelphia, Pittsburgh, Detroit, Boston, Buffalo, Birmingham and other cities.

Plants are at Hammond, Ind., (near Chicago); Lincoln, N. J. (near New York); Wampum, Penn. (near Pittsburgh) and Birmingham, Ala.

It is proposed to name the company the Federal-American Cement Tile Co.



New Lime Plant Nearing Completion in Eastern Pennsylvania

F. S. Wood

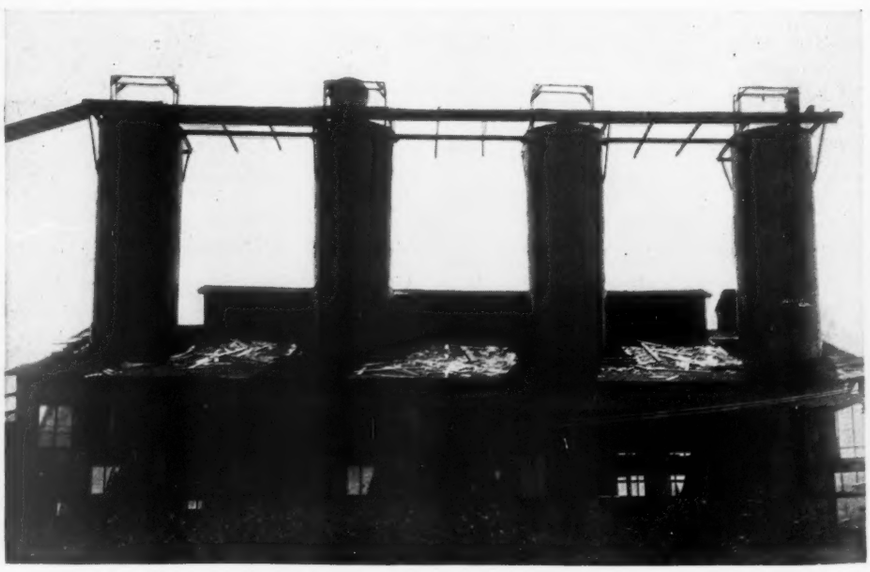
DURING THE EARLY SUMMER of this year, the Chester Valley Lime and Products Co., West Chester, Penn., completed plans for the construction and erection of a new 4-kiln lime and hydrate plant near Paoli, Penn. This plant is now nearly completed and lime will be produced and put on the market before the first of December.

There are several interesting things in connection with the design and erection of this plant. In the first place, it is probably the first time that a 4-kiln lime and hydrate plant has been designed, erected and put in operation in so short a period. From the time the contract for the design and erection of the plant was signed until commercial lime is on the market will be less than five months. Another interesting feature is that a crushing plant was erected first and commercial stone produced while the lime plant itself was being erected. Still another interesting feature is the structural design of the lime plant itself in which the details of the incline, firing floor and top of the kilns embody new features. The views show particularly the new features covering the top of the kilns and how the kilns have been utilized to carry the load of the trestles and frame work for discharging the stone into the kilns.

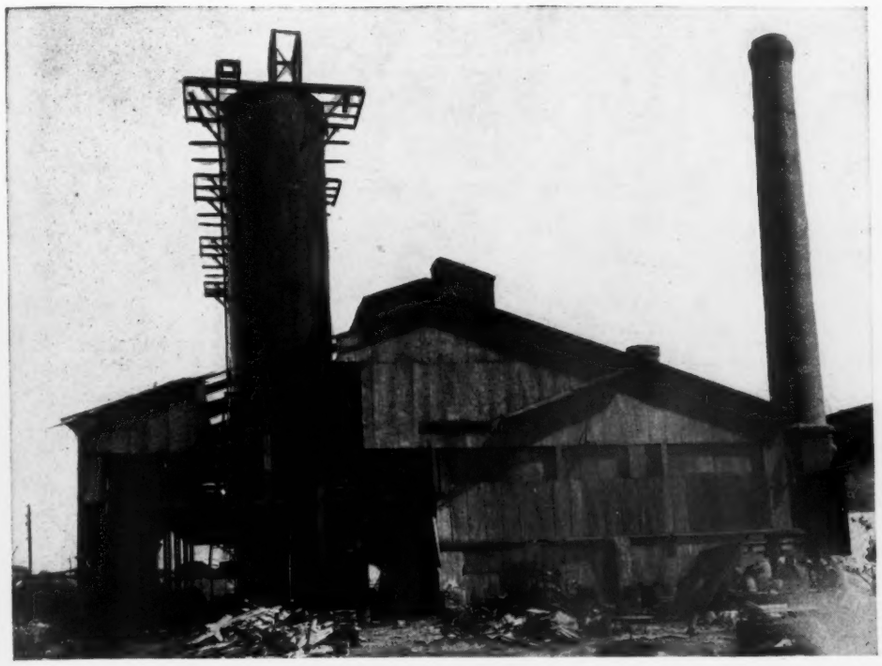
The building housing the plant is an old refractories plant, which will be renovated with new siding when construction work is completed. The lime plant was designed to fit into this structure, another unusual feature.

The contract for the complete plant was undertaken by the McGann Manufacturing Co., Inc., York, Penn. The design of the plant itself represents the co-ordinated efforts of the engineers for the McGann Manufacturing Co. and Charles Spellman, of the Chester Valley Lime and Products Co. Mr. Spellman has been engaged in the manufacture of lime practically all his life, having previ-

Charles Spellman



Side view of the Chester Valley Lime and Products Co., West Chester, Penn. being completed



An end view of the new plant during course of construction

ous to his connection with the Chester Valley Lime and Products Co. been in charge of the lime plant of the Knickerbocker Lime Co., which was absorbed something over a year ago by the Warner Co. Mr. Spellman's large experience and knowledge have had an important part in the several and unusual features of this new lime plant.

Stone from the quarry is loaded into Easton all-steel, side-dump cars and hauled up an incline on a 24-in. gage track by a Lidgerwood, single-drum hoist, and should the stone be for the crushing plant, is discharged half-way up the incline into a hopper that feeds a No. 5 Austin crusher. The product from the crusher is then sized according to the commercial requirements through Austin cylindrical screens. If the stone is intended for the lime plant, it continues past the crushing plant up to the tops of the kilns where it is discharged. These kilns are the McGann "York vertical self-supporting" kilns designed for coal firing. They are 60 ft. from the draw floor level to the top and 11 ft. in diameter. The firing floor itself is 14 ft. above ground level and is 23 ft. wide and of sufficient length to go around the end of the kiln. The kilns have been placed on 30-ft. centers with the furnaces running lengthwise of the building. The brick for lining these kilns is of General Refractories and Harbison-Walker manufacture.

The lump lime when drawn from the kilns will be conveyed by a pan conveyor under the kilns, which is 30 in. wide and about 105 ft. centers and discharged to an inclined conveyor, which will deliver the lump lime at an angle of approximately 30 deg. into a self-supporting circular storage bin of 75-ton capacity. This storage bin is provided with a gate for delivering the lump lime to a conveyor and a picking table, and this conveyor in turn delivers to a vibrating screen 8 ft. by 4 ft.

A Pennsylvania roll crusher has been installed for crushing the fines passing through the vibrating screen. The lime coming from the Pennsylvania crusher will be delivered by means of a steel chute to continuous type bucket elevator, which will deliver the crushed lime to a 12-in. diameter screw conveyor, which will in turn convey the lime to a hydrator feed bin.

A complete McGann Schulthess hydrate plant with a capacity of 5 tons of finished hydrate per hour has been installed, equipped with a Sturtevant air separator. The hydrated lime will be delivered to a steel encased elevator, which will deliver the lime through a 12-in. screw conveyor to the 10-ft. diameter Sturtevant centrifugal air separator, which will in turn deliver the lime to storage at once. This hydrate storage will be of 100-ton capacity and will be arranged in two compartments, so that one side can be filled, while the hydrated lime is being bagged from the other side. The finished hydrated lime will be packed by a Bates bag packer.

The offices of the Chester Valley Lime and Products Co. are at West Chester, Penn., and F. S. Wood is president of the company. The plant itself is located on the outskirts of Paoli, where the company owns large deposits of a very high-grade dolomitic limestone.

"Jack" Vrabek Made Vice-President of Sturtevant Mill Co.

THE many friends of "Jack" Vrabek will be interested to hear of his promotion to be vice-president and sales manager of Sturtevant Mill Co. and also vice-president of Sturtevant Engineers, Inc.

The wide experience of Mr. Vrabek in the machinery and engineering field well qualifies him for the responsibilities of his new position. His company's announcement truthfully says: "There are few men who can equal him in experience in the non-metallic mineral and chemical fields where a thorough knowledge of the materials, processes, methods and equipment are necessary to success."

His success, according to his company's announcement, is largely based upon his ability to analyze a proposition from the reverse angle, that is, starting with the product and working back through process, method and finally to equipment. His friends in the rock products industry certainly will concede that he has contributed much expert engineering advice as well as having sold machinery.

Mr. Vrabek will be located as heretofore in the Singer Building, 149 Broadway, New York.

Lock Joint Pipe Co. to Establish Delaware Plant

ANNOUNCEMENT that the Lock Joint Pipe Co., of Ampere, N. J., had obtained a storage shed and erected a temporary office at the south end of Western avenue, Elsmere, Del., was made recently. The company was recently awarded the contract for the laying of a pipe line six miles long from the Old Mill Dam to Eighteenth and Baynard boulevard. The Lock Joint Co. was the low bidder at approximately $400,780.

The company had endeavored to obtain a site at Baltimore and Ohio railroad, near Twenty-fifth street, a few weeks ago, but action on granting them the necessary building permit was postponed. Unwilling to hold back their work any longer, because of this delay, the Lock Joint Pipe Co., decided to take the less convenient site which they could occupy at once.—*Wilmington* (Del.) *Evening News.*

Michigan Suspends Operation of State Cement Plant

TEMPORARY SUSPENSION of operations at the state cement plant in Chelsea, Mich., was announced recently by John W. Miner, member of the state prison commission. Storage bins are filled, Mr. Miner said, and resumption of work depends on consumption. Products of the plant are used only by the state. Nearly 200 prison inmates will remain at the camp plant ready to resume the work, he said.—*Grand Rapids* (Mich.) *Press.*

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Pennsylvania Crushed-Stone Producer Has Profitable Products Plant

Berks Products Corp., Reading, Penn., Operates Two Crushed-Stone Plants and a Concrete Building Products Plant

AT READING, PENN., are four crushed-stone operations, all serving the city of Reading and the contiguous territory. Within a radius of 40 miles, especially to the south and to the west, are a multitude of other crushed-stone operations, trap rock and limestone, so that the operators in the city of Reading have plenty of competition both locally and within short shipping radii. This over-planted condition led to unsatisfactory market conditions, and after a few years of struggle the operators at Reading began to realize the futility of continuing without some co-operation among themselves. The ultimate solution came when the Berks Products Corp. was organized as the parent company and the four operations at Reading merged into one company under that name. The companies that merged January 1, 1929, were the Fehr and O'Rourke Stone Co., the Berks Cast Stone Co., the G. W. Focht Stone Co., and Mays Bros., Inc. The components of the company are still operated under their old individual firm names, however.

To operate economically, the parent company shut down two of the plants and is operating the two remaining ones, which are so located as to serve the city territory economically, one plant being located at the northern outskirts of the city and one at the southern.

The main source of production is at present coming from the plant of the Berks Cast Stone Co. at South Temple, Penn., which is four miles from the center of Reading along the state highway leading to Allentown. The second production unit is the former Fehr and O'Rourke Stone Co. at the opposite edge of the town. Both of the plants are several years old, but nevertheless have many interesting things about them that justify the readers' time in a perusal of this short description. The G. W. Focht Stone Co.'s and the Mays Bros., Inc., plants are at present inactive.

In the South Temple quarry a new 75 Lorain electric shovel using a 1¼-yd. dipper

Arrangement of South Temple tile plant with respect to the crushing unit and switching facilities. Powder storage house is built into the ramp at the right

Secondary drilling in quarry of Berks Cast Stone Co.

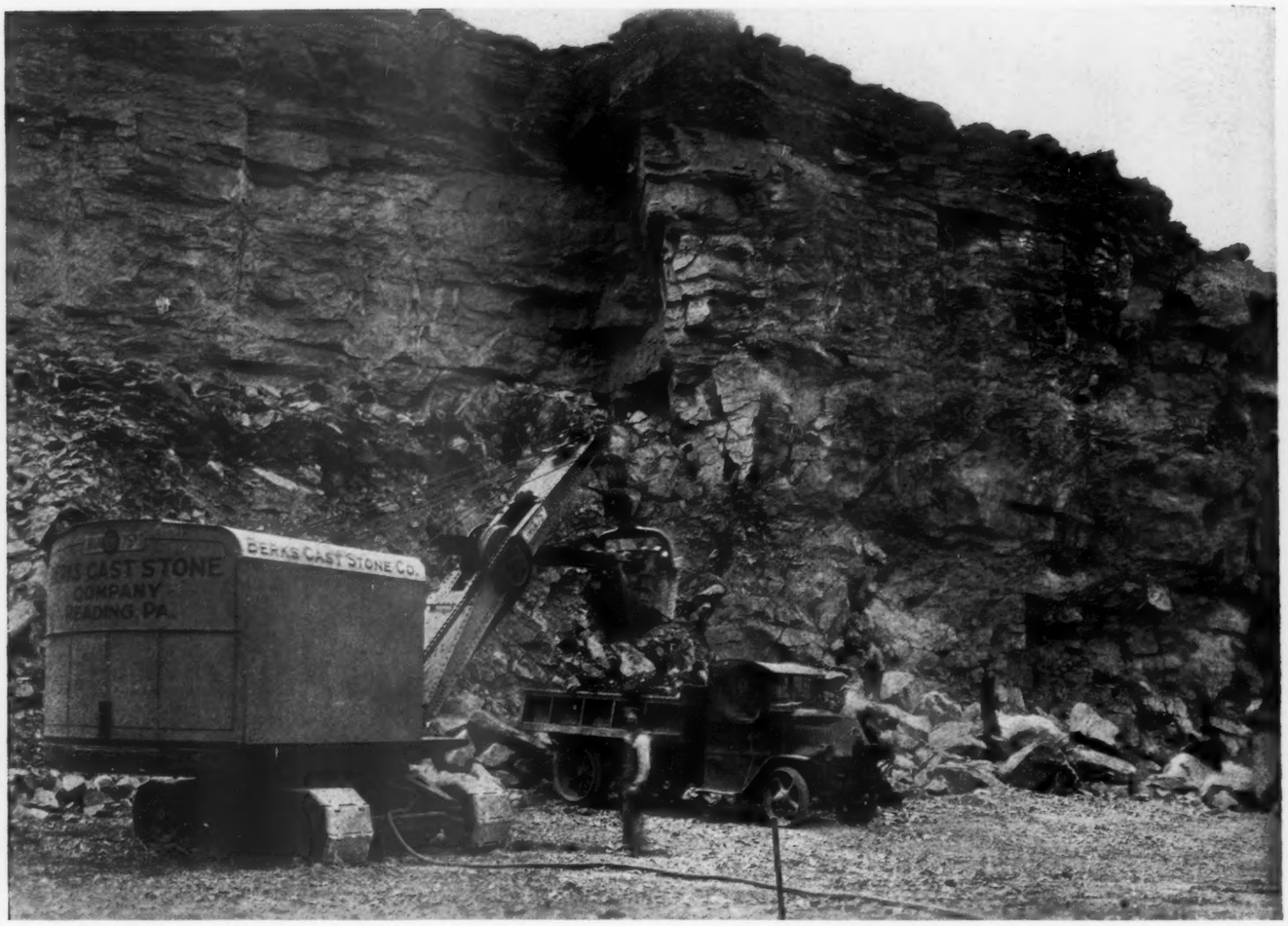
Rail grizzly at head of secondary crusher in Berks operation

has been installed, replacing the older equipment; and through faster loading, fewer stops due to breakdowns, and more efficient all-around operation, it has been possible to haul more stone with fewer trucks. The company formerly used three 5-ton trucks, but due to the better loading facilities, two trucks will keep the plant operating to its maximum capacity of 1000 tons per day of 10 hours. At present an International and a Mack truck, equipped with Easton type bodies, do the hauling. The haul is not over 300 ft. on the average.

Primary drilling is done by contractors at a reduction in cost over that for which the company could do the work. This is an interesting though secondary item. The quarry face, oval in shape, has a height of 55 to 65 ft. and a length of about 500 ft. The stone is a hard limestone, blue, well stratified, so that primary shooting yields a fairly small product. About 3½ tons of stone per pound of

The 1/3-yd. shovel used for stripping is very adaptable for working on uneven ground at South Temple operation

Drilling in both quarries is done by contract and has resulted in large saving



Novel method of operating enables electric shovel to use a shorter length of cable than is customary in most quarries

explosive are secured. This is very good, as it is only possible to shoot four or five holes at one time, owing to the nearness of the operation to residential sections. The holes are drilled on 15- to 20-ft. centers, 15 to 20 ft. burden, and are loaded with both 60% and 40% dynamites. Cordeau-Bickford is used as the detonator. To maintain a level floor, without humps, the primary holes are drilled 4 ft. below the quarry floor. Ingersoll-Rand Jackhamer drills are used for secondary drilling.

Quarry at the Fehr and O'Rourke Stone Co.

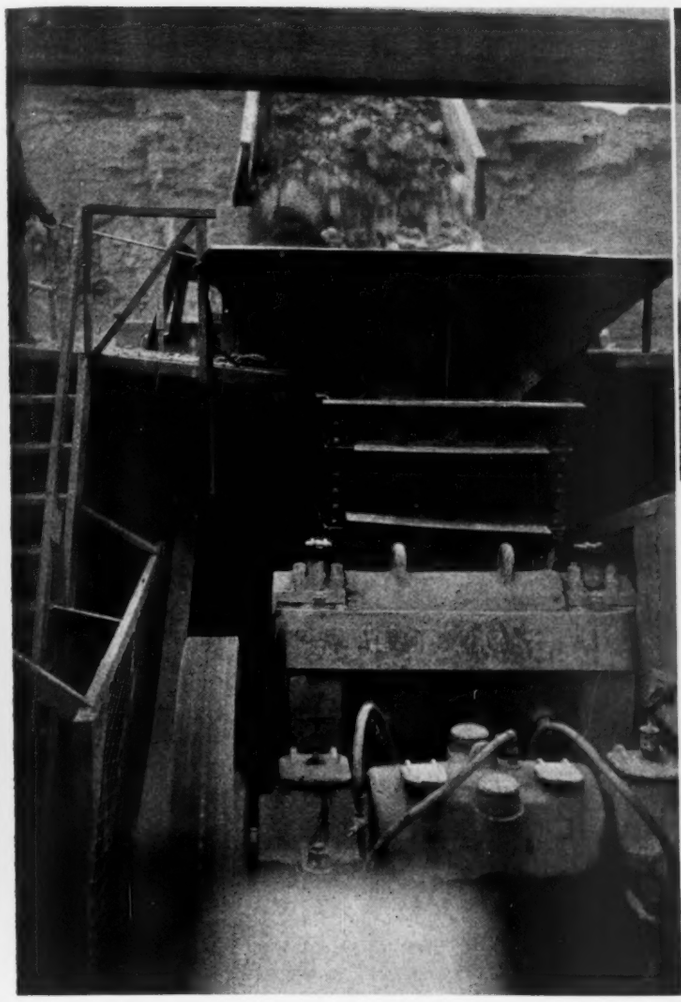
Electric Cables for Shovel in Trenches

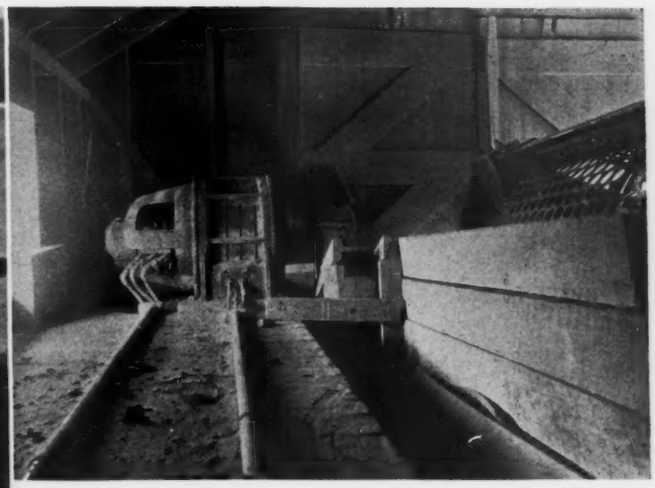
To obviate the necessity of having a long cable serve the new electric shovel, L. C. Nesbit, superintendent, had several trenches dug in the quarry floor and conduits installed which were provided at their outer ends with suitable plugs. The shovel operator then simply plugs into whichever one of these circuits is most convenient for him, doing away with handling and dragging over the quarry floor great lengths of cable.

There is a small amount of stripping, which is removed with a ⅓-yd. gasoline Universal shovel mounted on McCormick-Deering crawler treads. This little shovel has a range of usefulness that can only be appreciated by seeing it operate over the uneven top and flanks of the quarry. The overburden is loaded to trucks and discarded. At present this work is being done under contract.

Crushing Plant

The stone is dumped to a Stephens-Adamson pan feeder serving a 36-in. by 48-in. Traylor jaw crusher that rests in a pit and at a slight elevation above the quarry floor. A 5-ton Vulcan, hand-operated chain block is mounted over the primary crusher. The jaw crusher discharges to a 20-in. Stephens-Adamson steel bucket elevator that delivers





All of the drives with the exception of the primary crusher are of the enclosed type at the South Temple plant

Left, truck discharging to the pan conveyor which feeds jaw crusher at Berks plant. The crusher is installed in a pit at a slightly higher elevation than the quarry floor

to a rail grizzly, the oversize from which falls to a 12-in. Traylor gyratory crusher. The fines from the rail grizzly and the discharge product from the gyratory crusher are elevated to the main 4-ft. by 31-ft. Traylor rotary screen by a 12-in. steel Jeffrey bucket elevator. The primary crusher is driven by a 125-hp. General Electric induction motor by a 12-in. belt, but unless otherwise stated, all the other pieces of equipment in the plant are direct-connected to their drive motors by enclosed gear reduction units. General Electric induction motors are used throughout the plant also, unless otherwise stated. The pan conveyor feeding the jaw crusher is driven from the same motor which serves the first reduction unit.

The secondary crusher is driven by a 50-hp. motor and the two buckets by 40- and 15-hp. motors, respectively. The 40-hp. motor is a Western Electric.

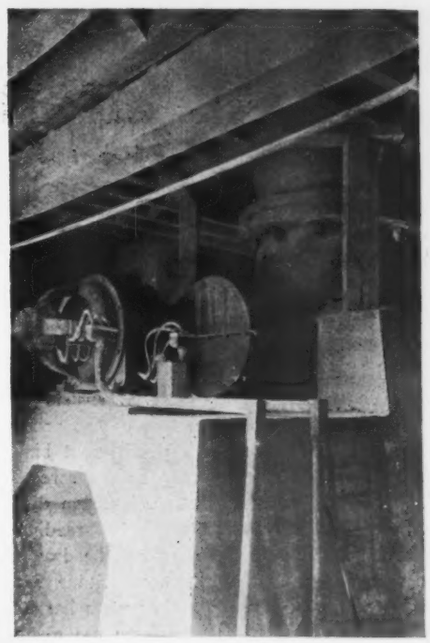
The primary rotary screen is of interest, as it has had sections added to it by Mr. Nesbit in such a manner as to have great rigidity and does not "crawl" or twist due to the greater torque from such a long screen. He extended the four angle irons that support the screens by riveting on a 54-in. length of angle iron using twelve ¾-in. rivets spaced 4 in. apart, giving a strength to the new member that is probably greater than the original screen. The screen originally was 20 ft. long.

The main barrel of the primary screen has 16 ft. of 1¼-in. round perforations, then 7 ft. of 1½-in. holes and an end section of 8 ft. of 2¾-in. round holes. The end section also is often equipped with 3½-in. holes for railroad ballast, etc. A 14-ft. dust jacket is provided, having first an 8-ft. section of ⅜-in. holes and a 6-ft. section following of ⅝-in. wire cloth.

The fines from the dust jacket fall to a bin and can be sold as such or can be re-

Neatly constructed powder magazine using company's own tile. The office is of similar construction

elevated by a 4-in. bucket elevator to a 14-in. belt conveyor serving two Hum-mer screens. The upper deck of these vibrating screens has ¼-in. wire cloth and the lower has ⅛-in. cloth. The fines from the lower deck are used for the production of concrete tile in the company's own plant. The oversize from the screen is sold for chips or passed through



The secondary crusher and drive motor

a small pair of rolls for the production of additional fines for the concrete plant. The crushing of additional material to secure more fines is one of the novelties of the entire operation. Most plants wish to produce as small amount of minus ¼-in. material as possible, but this company is now even considering installing additional fine grinding equipment.

The oversize from the primary rotary screen falls to a bin serving a 4-in. Traylor gyratory crusher, the discharge of which

Truck unloading at primary crusher in Berks quarry

falls to an 18-in. belt conveyor and is then delivered to a 12-in. bucket elevator. The bucket elevator serves a second but smaller Good Roads 32-in. by 18-ft. rotary screen. This screen has a 3-ft. dust jacket of ¼-in. wire cloth with the first 6 ft. of the main barrel being ½-in. round perforations. The 6-ft. end section of the screen consists of ¾-in. round perforations. All of the products from this screen fall to different bins from those under the other rotary screen. The bins, of wooden construction, can discharge to cars for shipment via the Reading railroad serving the plant, or can be drawn to trucks for local distribution. Stone for shipment on the Pennsylvania system has to be trucked a short distance from the plant to a ramp from which the cars on that railroad can be loaded.

The first rotary screen is driven by a 20-hp. motor and the smaller one by a 5-hp. unit. The 4-in. gyratory crusher is direct-connected to a 40-hp. motor which also drives the crusher's offbearing conveyor with a 5-hp. motor driving the small bucket elevator that serves the small rotary screen.

Stock Piling

Considerable material is carried in stock piles that are built up by trucks driving on top of the pile and discharging their loads. This material is reclaimed by a Barber-Greene loader and a Type K Jeffrey radial loader. In the event that cars are to be loaded from the stock piles, the trucks run up a short ramp and discharge direct to the gondolas. A hinged lip is provided on the rim of this ramp to prevent excess spillage to the ground when dumping to cars.

The plant produces the following sizes: Sand ⅛-in. to ¼-in., ⅜-in. chips, ½-in. to ¾-in., 1-in., ⅝-in. to 1-in., 1⅛-in. to 2½-in., and ballast (1½-in. to 4-in.).

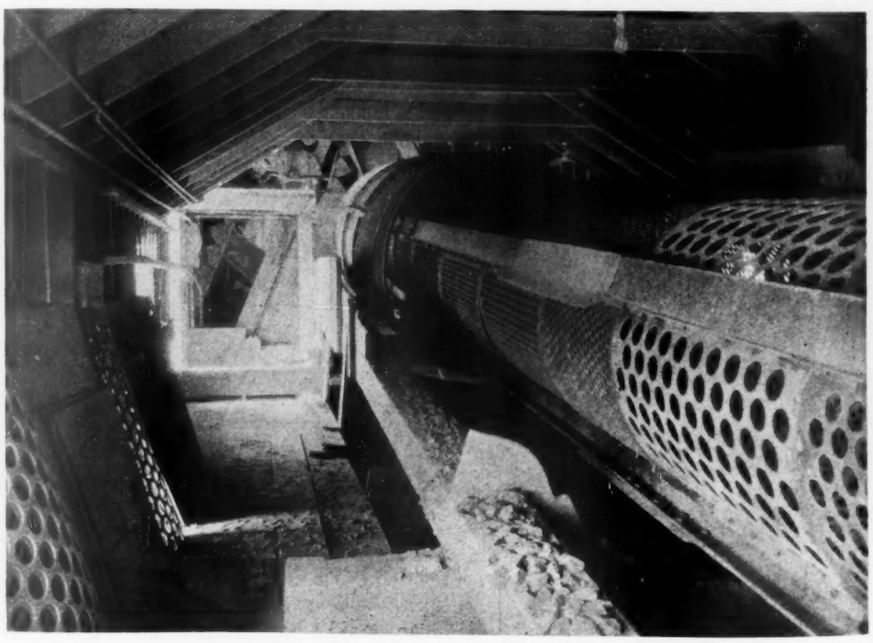
Air Supply

Air for secondary drilling is supplied by an Ingersoll-Rand Class ERI, 12-in. by 16-in. compressor that is belted through a short center drive to a 65-hp. General Electric synchronous motor. The building housing the compressor also contains the plant office and a small repair shop. Drill steel is sharpened in this shop by a I.R.-50 drill sharpener and oil furnace. The churn drills are sharpened at the rig by the contractors themselves.

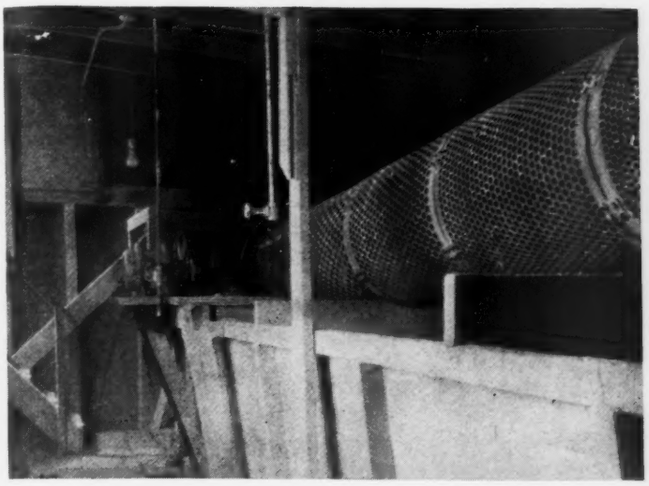
Concrete Tile Plant

The tile plant uses a 1-yd. Blystone mixer that discharges to an 18-in. belt serving the two tile machines. The latter machines were originally hand presses of ancient design but have been so completely changed and altered that they can best be said to be the invention of the company's staff. The hand-operated rig has been changed so that the machine is a semi-automatic machine capable of turning out 1500 tile per 8-hr. day.

No sand is used other than the limestone dust from the screening plant. This is mixed with the fines in the proportion of seven parts of limestone (¼-in. to dust) to one part of portland cement. The tile plant labor is all done, piece work, by two operators who mix their own batches, make the tile, transport the tile to the curing yard and other miscellaneous duties. Working on a contract basis, the two operators have developed their technique to a very efficient operation. The tile machines each use a 5-hp. Westinghouse motor.



The primary screen at South Temple plant, lengthened from 20 ft. to 31 ft. The splice can be seen in this view



The secondary screen at the South Temple plant

Once the tile are made, they are placed on racks holding 42 tile each and are placed in the curing room by means of a Lewis-Shepard Co., Type WSSP, Model 10-WS-3, 3500-lb. capacity jack lift.

The tile are cured inside for 24 hours, after which they are transferred to the yard outside and sprayed with water from a garden hose until completely cured. The tile plant and the enclosed curing room are all in the same room.

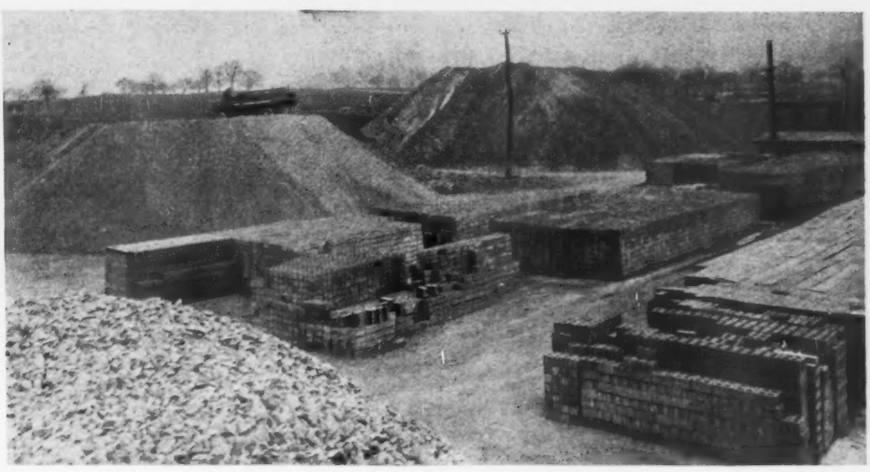
The tile machine at the right is a practically home-made product but is capable of a large daily output

Fehr and O'Rourke Plant

At the present time the plant has a capacity of 1000 tons per day, all of which is trucked to Reading and vicinity. The plant uses a

The platform at the left is used for loading gondolas from the stock piles. Cars are switched to and from the plant by trucks at Berks plant

The tile storage yard served by jack trucks over well constructed concrete walks



Considerable material is carried in stock piles served by trucks. The tile-curing yard is in the foreground

Drill heating and sharpening is done in a neatly constructed concrete building adjoining the plant office at South Temple

36-in. by 48-in. Buchanan jaw crusher, driven by a 150-hp. General Electric motor, as a primary unit. Two gyratory crushers, a 24-in. by 48-in. Champion and a No. 37 Kennedy-Van Saun, are used for secondary and finishing reductions. There are three Good Roads rotary screens equipped with "Rol-man" manganese steel perforated plates. The screens are so arranged that the material from the dust jacket of the first rotary passes to one of the smaller rotary screens for classification of the finer sizes.

The oversize from the first rotary screen falls to the finishing crusher, which in turn feeds the third rotary screen. This plant, as is the case with the South Temple plant, operates dry and the various sizes of products produced fall to bins below.

Loading in the quarry is done by a No. 700 P. & H. gasoline, 1¼-yd. shovel that is mounted on crawler treads. Primary drilling is done by contract and secondary drilling by Denver rock drills.

Stockpiling is done similarly as at the South Temple plant, except that a part of the quarry face is used as the point from which the sized stone is dumped. Reclaiming to trucks is by Barber-Greene portable loaders. Air for secondary drilling is supplied by a Sullivan compressor that is belted to a 40-hp. induction motor.

Personnel

The offices of the Berks Products Corp. are at 726 Spring street, Reading, Penn. James O'Rourke is president; Harry Muth, general manager, and Walter Fehr, secretary. L. C. Nesbit is superintendent of the South Temple plant and Joe Gravagna and Frank Pehlman, quarry and mill foremen, respectively. A. Larson is superintendent of the Fehr and O'Rourke plant.

Types of Highway Pavements Specified by States

OF INTEREST is a tabulation recently compiled by the American Road Builders' Association, Washington, D. C., showing the principal types of highway pavements specified by the different states. The information was extracted from each of the latest available state highway specifications, and is set forth in alphabetical order below. Macadam includes all types except those bound by bituminous materials. Bituminous concrete includes pre-mixtures of aggregates and bitumen.

Amiesite—Arkansas.

Asphaltic block—New Jersey, New York.

Bituminous concrete—All states except Connecticut, Idaho, Iowa, Maine, Maryland, Montana, Nevada, New Mexico, North Dakota, South Dakota, Utah, Vermont, Washington, Wisconsin, Wyoming.

Bituminous macadam—All states except Iowa, Kansas, Louisiana, Minnesota, Mississippi, Nebraska, Oregon, Utah.

Brick—Alabama, Colorado, Florida, Georgia, Illinois, Indiana, Kansas, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, Texas, West Virginia.

Concrete, plain—All states except Massachusetts, Montana, Nevada, New Hampshire, North Dakota, Rhode Island, Wyoming.

Concrete, reinforced—All states except Colorado, Iowa, Montana, Nevada, North Dakota, Virginia, Wyoming.

Concrete base, plain—All states except Arizona, California, Idaho, Iowa, Maine, Massachusetts, Montana, Nevada, New Hampshire, New Mexico, North Dakota, Oregon, South Dakota, Utah, Vermont, Washington, Wisconsin, Wyoming.

Concrete base, reinforced—Alabama, Arkansas, Connecticut, Florida, Georgia, Illinois, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Nebraska, New Jersey, New York, North Carolina, Tennessee, Texas, West Virginia.

Macadam—All states except Florida, Kansas, Minnesota, Mississippi, Nebraska, Pennsylvania, South Carolina.

Rock asphalt—Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Pennsylvania, South Carolina, Tennessee, Texas, Vermont, Virginia, West Virginia.

Sand asphalt—Arizona, Delaware, Florida, North Carolina.

Sheet asphalt—Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Nebraska, New Jersey, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, West Virginia.

Stone block—Maryland, New Jersey, New York.

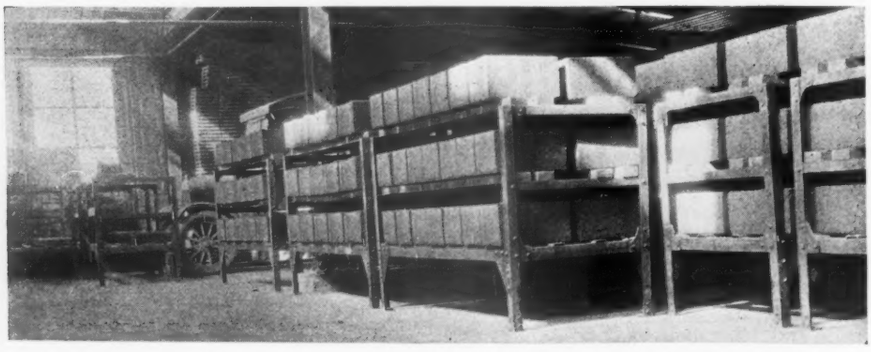
Vibrolithic concrete—Mississippi.

Warrenite, bitulithic—Alabama, Arkansas, Colorado, Florida, Mississippi.

Willite sheet asphalt—Mississippi.

Wood block—Maryland, New York.

The above list shows that forty-one states have specifications covering concrete roads, both plain and reinforced, and macadam roads, while forty states have specifications covering bituminous macadam roads. Thirty-three have specifications on bituminous concrete roads, twenty-four on sheet asphalt, and twenty on brick.



Green tile is stored in racks of this type for 24 hours and then hauled to the outside curing yard

Robert Parsons, Columbia Cement Superintendent, Killed in Ohio Mine Accident

ACCORDING to newspaper dispatches received as we go to press, Robert Parsons, superintendent of the Columbia Cement Division, Pittsburgh Plate Glass Co., Zanesville, Ohio, was among those killed November 5 in the explosion at No. 6 mine of the Sunday Creek Coal Co. at Millfield, near Athens, Ohio. The cause of this disaster in which it is feared more than 100 miners lost their lives is still in doubt. The blast occurred while officials of the coal company and invited guests were making a tour of inspection of the mine.

Mr. Parsons, who for a number of years had been in charge of the operation of the Zanesville plant, was well known in the portland cement industry as a progressive and efficient operating officer.

Standard Method of Analysis of White Pigments

THE AMERICAN STANDARDS ASSOCIATION has just approved a revised American Standard method of routine analysis of white pigments. The revision was proposed by the American Society for Testing Materials which also submitted the original standard approved by the American Standards Association in 1929.

Copies of the revised standard may be obtained either directly through the American Standards Association, 29 West 39th Street, New York City, or from the American Society for Testing Materials, 1315 Spruce Street, Philadelphia, Penn., for 25 cents per copy.

Big Building Contractor Reports Increase in Inquiries

THE HEAVIEST VOLUME of construction projects for any similar period since the spring of 1929 has come to the eastern offices of large contractor builders for estimates and figuring during the past three weeks, according to Lou R. Crandall, president of the George A. Fuller Co., subsidiary of U. S. Realty and Improvement Co.

The fact that these projects involve largely commercial, manufacturing and other private business holdings offers strong basis for belief, according to Mr. Crandall, "that business is emerging from the doldrums," and that a return of business confidence is manifesting itself.

Pointing out that every $1,000,000 in construction offers full time, 12-months employment for 100 men, and actually employs nearly 1000 men for varying periods during the life of the job, Mr. Crandall estimates that projects now in his New York office for figuring involve employment for 25,000 construction workers and a direct construction labor payroll of from $8,000,000 to $10,000,000.

These projects, he stated, involve more than $25,000,000 in new construction work in the New York offices of his company, and are exclusive of large projects being figured on in Boston, Philadelphia, Washington and Chicago offices.

One Newspaper Editor with Understanding!

IN AN INTERVIEW given out several days ago C. E. Jones, chairman of the South Carolina State Highway Commission, at last states how the commission is to make a profit on the cement bought in quantities and re-sold to the contractors. The explanation, however, is not only belated but indefinite.

"The present price on cement made our contractors," states Mr. Jones in *The State*, "is $2.52 a barrel. The highway department buys the cement at $2.32 a barrel, and makes 22 cents on each barrel sold." The savings, Mr. Jones tells us, will be about $400,000 annually.

This is quite true, in a way. But, Mr. Jones does not deny the claim, quite widely made, that the contractors themselves could have bought the same cement for $2.32 or less and that, consequently, when they make their bids based on $2.32 cement they pass the 20 cents back to the State. Therefore, the mythical $400,000 profit vanishes into the air.

With all of its hullabaloo about foreign cement, wholesale buying, dealer's commissions and cash discounts the department has not yet claimed that it can buy or has bought cement cheaper than the contractors can buy it. Until it does that it cannot justify itself in going into the cement business nor can it substantiate claims of economy in that direction. Then, why be in the business?—*Laurens* (S. C.) *Advertiser*.

A Helpful Publication

OXY-ACETYLENE TIPS announces that its November issue is also its 100th issue. It is published monthly by the Linde Air Products Co., a unit of the Union Carbide and Carbon Co., New York City, and is devoted to oxy-acetylene welding and cutting in all its phases. The November issue contains a long article on "The Progress of Bronze-Welding" that will prove especially helpful in posting plant operators on the most approved, up-to-date methods in this commonest use of welding.

Beg Your Pardon!

THROUGH an error the portrait used in the obituary of George A. Moritz, district superintendent, Lehigh Portland Cement Co., Allentown, Penn., published in our issue of October 25, was that of W. D. Montz, superintendent of the Ormrod, Penn., plant of the Lehigh Portland Cement Co.

American Vibrator Screens for Diamond Recovery

IN BRAZIL they are figuring the capacity of two Stephens-Adamson vibrator screens, not in tons but in thousands of dollars worth of diamonds per hour.

A deposit of loosely cemented gravel containing a high percentage of diamonds has been discovered and is going to be worked by the Brazilian Highlands Corp. of Brazil, S. A. The gravel is easily disintegrated and of such a nature that the rough diamonds can be separated out and graded by screens.

After being dug, the chunks of cemented gravel are put through a Stephens-Adamson "log washer," consisting of two 12 in. diameter inclined screw conveyors rotating side by side in a water-tight tank with an inclined bottom. The diamond bearing gravel is put in at the deep end under a spray of water. The conveyor screws driven in opposite directions turn the gravel over and over as they push it up the incline and on to a 4 ft. by 8 ft. single deck S-A vibrator screen.

The screen takes out the fine material, which has been loosened and delivers to an Allis-Chalmers 3 ft. by 8 ft. round mill where a further reduction is made. The mixture of sand and diamonds is then spread out over a second vibrator, which separates out the 12-mesh. An S-A revolving screen 3 ft. diameter by 10 ft. long grades into minus ⅛-in., ¼-in., ⅜-in. and ½-in. pebbles.

The engineers are planning to operate the two vibrating screens under washing sprays with provision for a further washing in the grading screen if necessary.

Incidentally, this reminds us that it has been reported at various times that diamonds have been found in Wisconsin gravels.

Prospectors Invited to Locate Phosphate Rock

A LETTER now on file at the Mojave, Calif., headquarters of *The Bakersfield Californian*, in quest of a phosphate deposit, may prove of interest to mining prospectors. The party states that the deposit should be favorable as to transportation, from mine to railroad. Naturally, much depends on transportation costs. Samples of the phosphate, apatite, turquoise and pyromorphite can be seen at the headquarters, as well as arsenates and vanadates of the same group. The material or rock should run from 65 to 75% phosphate of lime and not over 4% alumina and iron.—*Bakersfield* (Calif.) *Californian*.

Ready-Mixed for Courthouse

BIRMINGHAM'S new $3,250,000 courthouse was completed in record time through the use of ready-mixed concrete furnished by Woodstock Slag Corp. and Sloss-Sheffield Steel and Iron Co. of Birmingham, whose plants were described in our August 15 issue.

The Rock Products Market

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Attica and Franklinville, N. Y. (a)	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.15	1.15	1.75	.....	1.75	1.75
Buffalo, N. Y.	.....	1.05	1.05	1.05	1.05	1.05
Erie, Penn.	65	.95	1.25	1.25	.....	.....
Leeds Jct., Scarboro and South Portland Me., and Milton, N. H. (c)	.....	.50	.....	1.75	1.25	1.00
Machias Junction, N. Y.	.75	.75	.....	.....	.75	.75
Montoursville, Penn.	1.00	.70	.50	.40	.40	.40
Northern New Jersey	.18–.50	.18–.50	.50–1.25	.50–1.25	.50–1.25	.....
Georgetown, D. C.	.55	.55	1.00	1.00	1.00	1.00
CENTRAL:						
Algonquin, Ill.	.30	.20	.20	.35	.35	.40
Attica, Ind.			All sizes .75–.85			
Cincinnati, Ohio	.55	.55	.80	.80	.80	.80
Columbus, Ohio	.75–1.00	.45–.75	.60–.75	.60–.75	.60–.75	.60–.75
Des Moines, Iowa	.40–.70	.40–.70	1.50–1.85	1.50–1.85	1.50–1.85	1.50–1.85
Dresden, Ohio	.....	.60	.70–.80	.75	.75	.70
Eau Claire, Wis.	.40	.40	.50	.85	.85	.....
Elkhart Lake and Glenbeulah, Wis.	.40	.25	.50	.50	.45	.45
Grand Rapids, Mich.	.40	.40	.70	.70	.70	.70
Greenville, Ohio	.50–.70	.40–.60	.50–.60	.50–.60	.50–.60	.50–.60
Hamilton, Ohio	.65–.75	.65–.75	.65–.75	.65–.75	.65–.75	.65–.75
Hersey, Mich.	.....	.40	.....	.70	.70	.70
Humboldt, Iowa	.....	.45	.....	.....	1.25	.....
Kalamazoo, Mich.	.....	.50	.50	.60	.65	.....
Mankato, Minn.	.55	.45	1.25	1.25	1.25	1.25
Mason City, Iowa	.50	.50	.85	1.25	1.25	1.25
Milwaukee, Wis.	.....	.86	.86	.96	.96	.96
Minneapolis, Minn.	.35	.35	1.35	1.35	1.35	1.25
Oxford, Mich.	.25–.35	.20–.30	.30–.40	.55–.75	.55–.75	.60–.75
St. Paul, Minn.	.35	.35	1.25	1.25	1.25	1.25
Terre Haute, Ind.	.75	.60	.75	.75	.75	.75
Waukesha, Wis.	.....	.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	.50	1.00	1.00	1.00
SOUTHERN:						
Brewster, Fla. (d)	.40	.....	.....	.....	.....	.....
Charleston, W. Va.	.70	1.25	1.25	.....	.....	.....
Eustis, Fla.	.....	.40–.50	.....	.....	.....	.....
Fort Worth, Tex.	1.00	1.00	1.00	1.25	1.25	1.25
Knoxville, Tenn.	.80	1.00	1.50	1.20	1.20	1.20
Roseland, La.	.20	.20	.70	.70	.50	.....
WESTERN:						
Pheonix, Ariz.	1.25*	1.15*	1.50*	1.15*	1.15*	1.00*
Pueblo, Colo.	.80	.60	.....	1.20	.....	1.15
San Gabriel, San Fernando Valleys, Cal. (b)	.80	.80	1.30	1.30	1.30	1.30
Seattle, Wash.	1.00*	1.00*	1.00*	1.00*	1.00*	1.25*

*Cu. yd. ‡Delivered on job by truck. (a) Prices on trucks; on cars, 65c per ton for all sizes. (b) Discount, 20c per ton if paid by 10th of month following delivery. (c) In carload lots. (d) To consumers 50c.

Core and Foundry Sands

Silica sand quoted washed, dried, screened unless otherwise stated; per ton f.o.b. plant

City or shipping point	Molding, fine	Molding, coarse	Molding brass	Core	Furnace lining	Sand blast	Stone sawing
Albany, N. Y.	2.00	2.00	2.25	.....	.....	4.00	.....
Cheshire, Mass.	Sand for soap, 5.75–7.00					5.00	.....
Columbus, Ohio	1.50	1.50	1.35	.90	.....	3.50–4.50	.....
Dresden, Ohio	1.15–1.50	1.00–1.35	1.25–1.50	1.00–1.25	1.25	.....	.....
Eau Claire, Wis.	.....	.....	.....	.....	.....	2.50–3.00	.....
Elco, Ill.	Amorphous silica, 90-99½% thru 325 mesh, 10.00–60.00 per ton						
Kasota, Minn.	.....	.....	.....	.....	.....	.....	1.00
Montoursville, Penn.	.....	.....	.....	1.50–1.60	.....	.....	.....
New Lexington, Ohio	2.00	1.50	.....	.....	.....	.....	.....
Ohlton, Ohio	1.60	1.60	.....	1.75	1.60	1.75	.....
Red Wing, Minn. (a)	.....	.....	.....	.....	1.50	3.00	1.50
San Francisco, Calif.	3.50†	5.00†	3.50†	2.50–3.50†	5.00†	3.50–5.00†	.....
South Vineland, N. J.	Dry white silica sand, per ton, 2.25						

†Fresh water washed, steam dried. *Damp. (a) Filter sand, 3.00.

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Dresden, Ohio	.....	1.00
Eau Claire, Wis.	4.30	1.00
Ohlton, Ohio	1.75	1.60
Red Wing, Minn.	.....	1.00
San Francisco, Calif.	3.50	3.50

Glass Sand

(Silica sand is quoted washed, dried and screened)

Cheshire, Mass. (in carload lots)	5.00
Klondike, Mo.	2.00
Ohlton, Ohio	2.50
Red Wing, Minn.	1.50
South Vineland, N. J.	1.75
San Francisco, Calif.	4.00–5.00

Bank Run Sand and Gravel

Algonquin, Ill.¶ (½-in. and less)	.30
Buffalo, N. Y.—Sand, 1/10-in. down, 1.00; ¼-in. down, .85; gravel, all sizes	.75
Burnside, Conn. (sand, ¼-in. and less)	.75*
Fort Worth, Tex.¶ (2-in. and less)	.70
Gainesville, Tex.¶ (1-in. and less)	.55
Grand Rapids, Mich.¶ (1-in. and less)	.50
Hersey, Mich.¶ (1-in. and less)	.50
Kalamazoo, Mich.¶ (1½-in. and less)	.35
Mankato, Minn.†	.70
Winona, Minn.—Sand, any size	.60
York, Penn.—Sand, 1/10-in. down, 1.10; ¼-in. and less	1.00

*Cu. yd. †Fine sand. 1/10-in. down. ¶Gravel.

ROCK PRODUCTS solicits volunteers to furnish accurate price quotations.

Portland Cement

	F.o.b. city named Per Bag	Per Bbl.	High Early Strength
Albuquerque, N. M.	.92½	3.70	.....
Atlanta, Ga.	.....	2.19*	3.49¶
Baltimore, Md.	.....	2.26*	3.56¶
Birmingham, Ala.	.....	1.85*	3.15¶
Boston, Mass.	.47	1.88*	3.27¶
Buffalo, N. Y.	.51¼	2.05*	3.35¶
Cedar Rapids, Ia.	.....	2.23*	.....
Charleston, S. C.	.....	a2.29†	3.26¶
Cheyenne, Wyo.	.71½	2.86	.....
Chicago, Ill.	.....	1.95*	3.25¶
Cincinnati, Ohio	.....	2.14*	3.44¶
Cleveland, Ohio	.....	2.04*	3.34¶
Columbus, Ohio	.....	2.17*	3.47¶
Dallas, Texas	.....	1.90*	3.49¶
Davenport, Iowa	.....	2.14*	.....
Dayton, Ohio	.....	2.14*	3.44¶
Denver, Colo.	.76¼	3.05	.....
Des Moines, Iowa	.48½	2.29*	.....
Detroit, Mich.	.....	1.95*	3.25¶
Duluth, Minn.	.....	2.04*	.....
Houston, Texas	.....	2.00*	3.73¶
Indianapolis, Ind.	.54¾	1.99*	3.29¶
Jackson Miss,	.....	2.29*	3.59¶
Jacksonville, Fla.	.....	*2.16–b2.34†	3.46¶
Jersey City, N. J.	.....	2.13*	3.43¶
Kansas City, Mo.	.50½	2.02*	3.32¶
Los Angeles, Calif.	.57½	2.30	.....
Louisville, Ky.	.55½	2.12*	3.42¶
Memphis, Tenn.	.....	2.29*	3.59¶
Milwaukee, Wis.	.....	2.10*	3.40¶
Minneapolis, Minn.	.....	2.27*	.....
Montreal, Que.	.....	1.60‖	.....
New Orleans, La.	.....	1.92†	3.22¶
New York, N. Y.	.50¾	2.03*	3.33¶
Norfolk, Va.	.....	1.97*	3.27¶
Oklahoma City, Okla.	.61½	2.46*	3.76¶
Omaha, Neb.	.59	2.36*	3.66¶
Peoria, Ill.	.....	2.12*	.....
Pittsburgh, Penn.	.....	1.95*	3.25¶
Philadelphia, Penn.	.....	2.15*	3.45¶
Portland, Ore.	.....	2.50‡	.....
Reno, Nev.	.....	2.96‡	.....
Richmond, Va.	.....	2.32*	3.62¶
San Francisco, Calif.	.....	2.24‡	.....
Savannah, Ga.	.....	a2.29†	.....
St. Louis, Mo.	.48¾	1.95*	3.25¶
St. Paul, Minn.	.....	2.27*	.....
Seattle, Wash.	.....	1.50–1.75	2.40c
Tampa, Fla.	.....	2.00†	.....
Toledo, Ohio	.....	2.10*	3.50¶
Topeka, Kan.	.55¼	2.21*	3.51¶
Tulsa, Okla.	.58¼	2.33*	3.63¶
Wheeling, W. Va.	.....	2.02*	3.32¶
Winston-Salem, N.C.	.....	2.44*	3.74¶

Mill prices f.o.b. in carload lots, without bags, to contractors.

Albany, N. Y.	.....	2.15	.....
Bellingham, Wash.	.....	2.25	.....
Bonner Springs, Kan.	.....	1.85	3.15¶
Buffington, Ind.	.....	1.70	.....
Concrete, Wash.	.....	2.65	.....
Hannibal, Mo.	.....	1.80	.....
Hudson, N. Y.	.....	1.85	3.30¶
Independence, Kan.	.....	1.85	.....
Leeds, Ala.	.....	1.70	.....
Limedale, Ind.	.....	1.70	.....
Lime & Oswego, Ore.	.....	2.50	.....
Nazareth, Penn.	.....	2.15	.....
Northampton, Penn.	.....	1.75	.....
Richard City, Tenn.	.....	2.05	.....
Steelton, Minn.	.....	1.85	.....
Toledo, Ohio	.....	2.20	.....
Universal, Penn.	.....	1.70	.....
Waco, Tex.	.....	1.85	.....

NOTE: Unless otherwise noted, prices quoted are net prices, without charge for bags. Add 40c per bbl. for bags. *Includes dealer and cash discounts. †Includes 10c cash discount. ‡Subject to 2% cash discount. (a) 44c refund for paid freight bill. (b) 18c bbl. refund for paid freight bill. ¶"Incor" Perfected, prices per bbl. packed in paper sacks, subject to 10c discount 15 days. ‖Includes sales tax. (c) Quick-hardening "Velo."

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chazy, N. Y.	.75	1.60	1.60	1.30	1.30	1.30
Farmington, Conn. (a)	1.00	1.30	1.30	1.00	1.00	.....
Ft. Spring, W. Va.	.35	1.35	1.35	1.25	1.15	1.00
Oriskany Falls, N. Y.	.85–1.00	1.00–1.35	1.00–1.35	1.00–1.35	1.00–1.35	1.00–1.35
Prospect Junction, N. Y.	.50– .80	.....	1.00–1.15	1.00–1.10	1.00–1.10	.....
Rochester, N. Y.—Dolomite	1.50	.....	.....	.....	.....	.....
Hillsville, Penn.	.85	1.35	1.35	1.35	1.35	1.35
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Alton, Ill.	1.75	.....	1.75	.....	.....	.....
Afton, Mich.	.25	.25	.25	.....	.65	1.50
Cypress, Ill.	1.25	.90	.90	.90	.85	.85
Dubuque, Iowa	.....	.....	1.10	1.10	1.10	.....
Stolle and Falling Springs, Ill.	1.05–1.70	.95–1.70	1.15–1.70	1.05–1.70	1.05–1.70	.....
Greencastle, Ind.	1.25	1.00	.90	.90	.90	.90
Lannon, Wis.	.80	.80	.80	.80	.80	.80
Sheboygan, Wis.	1.20	1.20	1.10	1.10	.....	.....
Stone City, Iowa	.75	.....	1.10	1.00	1.00	1.00h
Toledo, Ohio	1.60	1.70	.....	1.60	.....	1.60
Toronto, Canada	2.25	2.75	2.25	2.25	.....	2.25
Waukesha, Wis.	.90	.90	.90	.90	.90	.....
SOUTHERN:						
Bridgeport, Chico and Knippa, Texas	1.00–1.10	1.25–1.30	1.20–1.25	1.15–1.20	1.10–1.15	1.05–1.10
El Paso, Texas	.50– .75	1.25	1.25	1.00	1.00	1.00
Olive Hill, Ky.	.50–1.00	1.00	1.00	.90	.90	.90
WESTERN:						
Atchison, Kan.	.50	1.80	1.80	1.80	1.80	1.70
Blue Springs and Wymore, Neb. (t)	.25	.25	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.10	1.25	1.25	1.25	1.00	.....
Rock Hill, St. Louis Co., Mo.	1.30–1.40	1.30–1.40	1.10–1.40	1.30–1.40	1.30–1.40	1.30–1.40
Stringtown, Okla.	1.00–1.10	1.25–1.30	1.20–1.25	1.15–1.20	1.10–1.15	1.05–1.10

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Penn.	1.20	1.60	1.45	1.35	.....	1.30
Branford, Conn.	.80	1.70	1.45	1.20	1.05	.....
Bridgeport, Chico and Knippa, Texas	2.25–2.50	1.80–2.00	1.50–1.60	1.30–1.40	1.20–1.30	1.00–1.25
Duluth, Minn.	1.00	1.25	1.75	1.65	1.35	1.25
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
New Britain, Plainville, Rocky Hill, Wallingford, Meriden, Mt. Carmel, Conn.	.80	1.70	1.45	1.20	1.05	.....
Northern New Jersey	1.35–1.50	1.40–2.10	1.40–1.90	1.30–1.50	1.30–1.50	.....
Richmond, Calif.	.75	1.00	1.00	1.00	1.00	.....
Stringtown, Okla.	2.25–2.50	1.80–2.00	1.50–1.60	1.30–1.40	1.20–1.30	1.00–1.25
Toronto, Canada	.....	5.30	3.70	.....	.....	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Cayce, S. C.—Granite	.....	.....	1.60	1.60	1.50	.....
Eastern Pennsylvania—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40b
Eastern Pennsylvania—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Lithonia, Ga.—Granite	.50	1.25	1.25	1.15	1.15	.....
Lohrville, Wis.—Granite	1.80	1.60	.....	1.50	1.50	.....
Middlebrook, Mo.—Granite	3.00–3.50	.....	2.00–2.25	2.00–2.25	.....	1.25–3.00
San Gabriel and San Fernando Valleys, Calif. (Granite)	.....	1.30	1.30	1.30	.....	1.30
(Basalt)	.....	.....	.....	.85	.....	.....
Toccoa, Ga.—Granite	.50	.....	1.30	1.25	1.20	1.15

(a) Stone 1-in., 1.10 per net ton. (b) Ballast. (c) 1-in., 1.40. (d) 2-in., 1.30. (h) Rip rap. (n) Ballast, R. R., .90; run of crusher, 1.00. (r) Cu. yd. (t) Rip rap, 1.20–1.40 per ton.

Crushed Slag

City or shipping point	Roofing	¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Bethlehem, Penn.	1.25–1.50	.50– .60	1.00	.60– .70	.70– .80	.70– .90	.90
Buffalo, N. Y., Erie and Du Bois, Penn.	2.25	1.25	1.25	1.35	1.25	1.25	1.25
Hokendauqua, Penn.	1.50	.60	1.00	.80–1.00	1.00–1.25	1.00–1.25	1.00–1.25
Western Pennsylvania	2.00	1.25	1.25	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05*	1.30*	1.80*	1.45*	1.45*	1.45*	.....
Jackson, Ohio	2.05*	.65*	1.80*	1.30*	1.05*	1.30*	.....
Toledo, Ohio	1.50	1.10	1.35	1.35	1.35	1.35	1.35
SOUTHERN:							
Ashland, Ky.	2.05*	1.05*	1.65*	1.45*	1.45*	1.45*	.....
Ensley and Alabama City, Ala.	2.05	.55	1.25	1.15	.90	.90	.80
Longdale, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.05
Woodward, Ala.†	2.05*	.55*	.....	1.15*	.90*	.90*	.....

5c per ton discount on terms. †1½-in. to ¾-in., 1.05; ⅜-in. to 10 mesh, 1.25*; ⅜-in. to 0-in., 90c*; ¼-in. to 10 mesh, .80*.

Agricultural Limestone (Pulverized)

Alton, Ill.—Analysis, 99% $CaCO_3$; 0.3% $MgCO_3$, 90% thru 100 mesh 4.00

Cape Girardeau, Mo.—Analysis, $CaCO_3$, 94½%; $MgCO_3$, 3½%; 90% thru 50 mesh 1.50

Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, per ton 6.00

Gibsonburg, Ohio—Bulk, 2.25; in bags 3.70

Jamesville, N. Y.—Bulk, 3.50; in 80-lb. bags 4.75

Knoxville, Tenn.—Analysis, 52% $CaCO_3$; 36% $MgCO_3$; 80% thru 100 mesh, bags, 3.75; bulk 2.50

Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; per ton 2.00

Middlebury, Vt.—Analysis, 99.05% $CaCO_3$; 90% thru 50 mesh 4.25

West Rutland, Vt. — Analysis, 96.5% $CaCO_3$; 1% $MgCO_3$; 90% thru 50 mesh; bags, per ton, 4.25; bulk 2.50

Agricultural Limestone (Crushed)

Bedford, Ind.—Analysis, 98.44% $CaCO_3$; .83% $MgCO_3$; 90% thru 10 mesh 1.50

Colton, Calif.—Analysis, 95-97% $CaCO_3$; 1.31% $MgCO_3$, all thru 14 mesh down to powder 3.50

Cypress, Ill. — Analysis, 96% $CaCO_3$; 90% thru 100 mesh, 1.25; 50% thru 100 mesh, 1.25; 90% thru 50 mesh, 1.25; 50% thru 50 mesh, 1.25; 90% thru 4 mesh, 1.25, and 50% thru 4 mesh 1.25

Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 4 mesh, 50% thru 20 mesh; bulk, per ton 1.00

Dubuque, Ia.—Analysis, 64.20% $CaCO_3$; 32.64% $MgCO_3$; 90% thru 50 mesh 1.10

Fort Spring, W. Va.—Analysis, 90% $CaCO_3$; 3% $MgCO_3$; 50% thru 100 mesh; bulk, per ton 1.15

Gibsonburg, Ohio—90% thru 10 mesh 1.00–1.50

Hillsville, Penn.—Analysis, 94% $CaCO_3$; 1.40% $MgCO_3$; 75% thru 100 mesh, sacked 5.00

Lannon, Wis. — Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh 2.00
Screenings (¼-in. to dust) 1.00

Marblehead, Ohio—90% thru 100 mesh 3.00
90% thru 50 mesh 2.00
90% thru 4 mesh 1.00

Marlbrook, Va.—Precipitated lime-marl. Analysis, 96% $CaCO_3$; 1% $MgCO_3$, 90% thru 50 mesh, bulk, 2.25; in burlap bags 3.75

Olive Hill, Ky.—90% thru 4 mesh, per ton 1.00

Branchton, Penn.—100% thru 20 mesh, 60% thru 100 mesh, and 45% thru 200 mesh, per ton a5.00

Piqua, Ohio—30%, 50% and 99% thru 100 mesh 1.00–4.00

Stolle and Falling Springs, Ill.—Analysis, 89.9% $CaCO_3$, 3.8% $MgCO_3$; 90% thru 4 mesh 1.25–1.70

Stone City, Ia.—Analysis, 98% $CaCO_3$; 50% thru 50 mesh ..... .75

West Stockbridge, Mass.* — Analysis, 95% $CaCO_3$; 90% thru 100 mesh, bulk 3.50
100-lb. paper bags, 4.75; 100-lb., cloth 5.25

Waukesha, Wis.—90% thru 100 mesh, 4.00; 50% thru 100 mesh 2.10

*Less 25c cash 15 days. (a) Less 50c comm.

Pulverized Limestone for Coal Operators

Davenport, Iowa—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, ton 6.00

Joliet, Ill.—Analysis, 48% $CaCO_3$; 42% $MgCO_3$; 90% thru 200 mesh (bags extra) 3.50

Piqua, Ohio—99% thru 100 mesh, bulk, 3.25; in 80-lb. or 100-lb. bags 4.25

Rocky Point, Va.—Analysis, 97% $CaCO_3$; 75% $MgCO_3$; 85% thru 200 mesh, bulk 2.25–3.50

Waukesha, Wis.—90% thru 100 mesh, bulk 4.00

Lime Products

(Carload prices per ton f.o.b. shipping point unless otherwise noted)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Bulk	Ground burnt lime, Bags	Lump lime In bulk	Lump lime In bbl.
EASTERN:								
Berkeley, R. I.	.....	.....	11.40	.....	.....	17.50	.....	20.65
Cedar Hollow, Devault, Mill Lane, Knickerbocker, Rambo and Swedeland, Penn.	.....	9.50b	9.50b	9.50b	8.00f	9.50d	8.50	.....
Lime Ridge, Penn.	.....	.....	8.00	.....	6.00	7.50[1]	4.50	.....
CENTRAL:								
Afton, Mich.	.....	.....	.....	.....	.....	10.85	6.50	.....
Gibsonburg and Cold Springs, Ohio	7.75	6.00	6.00	.....	6.00	8.00	6.00	.....
Marblehead, Gibsonburg, Tiffin, O., and Huntington, Ind.	10.50	7.75	7.75	11.00	7.00	9.00	7.00	.....
Milltown, Ind.	.....	9.00	8.25	9.50	7.50	.....	7.00	.....
Scioto, Ohio	10.50	6.50	6.50	7.50	.....	.....	7.00	15.00
Sheboygan, Wis.	.....	10.50	10.50	10.50	.....	.....	9.50	20.00e
Woodville, Ohio	7.75	6.00	6.00	9.00	6.00	8.00	6.00	15.00c
SOUTHERN:								
Keystone, Ala.	17.00	7.00	.....	7.00– 8.00	5.00g	11.55	5.00a	12.65
Knoxville, Tenn.	.....	.....	.....	.....	5.50	11.55	5.00	12.65
Ocala, Fla.	.....	11.00	11.00	.....	.....	.....	.....	.....
Pine Hill, Ky.	.....	9.00	8.00	7.00– 9.00	.....	.....	6.00	12.50
WESTERN:								
Kirtland, N. M.	.....	.....	.....	.....	.....	.....	15.00	.....
Los Angeles, Calif.	15.50	15.50	.....	.....	.....	.....	13.50	18.00
San Francisco, Calif.†	20.00	20.00	12.00	20.00	.....	.....	.....	.....
San Francisco, Calif.	19.00	14.00–17.00	12.50	14.00–19.00	14.50[5]	.....	11.00[4]	.....

[1]In 100-lb. bags. [4]To 14.50. [5]Also 13.00. *Price to dealers. †Wood-burnt lime: finishing hydrate, 20.00 per ton; pulv. lime, 2.00 per iron drum. Oil-burnt pulv. lime, 13.00–14.50 per ton. (a) To 7.00. (b) In 50-lb. paper. (c) In wood; in steel, 16.00. (d) In 80-lb. paper bags. (e) In steel. (f) For chemical purposes. (g) To 7.00.

Wholesale Prices of Slate

Prices given are f.o.b. at producing point or nearest shipping point

Slate Flour

Pen Argyl, Penn.—Screened, 300 mesh, 7.00 per ton in paper bags.

Slate Granules

Esmont, Va.—Blue, 7.50 per ton.

Granville, N. Y.—Red, green and black, 7.50 per ton.

Pen Argyl, Penn.—Blue-black, 6.50 per ton in bulk, plus 10c per bag.

Roofing Slate

City or shipping point	Prices per square—Standard thickness 3/16-in.	¼-in.	⅜-in.	½-in.	¾-in.	1-in.
Bangor, Penn.—						
Gen. Bangor No. 1 clear	10.00–14.00	20.00	25.00	29.00	40.00	50.00
Gen. Bangor No. 1 ribbon	9.00–10.25	16.00	20.00	25.00	35.00	46.00
No. 1 Albion	7.25–10.50	16.00	23.00	27.00	37.00	46.00
Gen. Bangor No. 2 ribbon	6.75– 7.25	.....	.....	.....	.....	.....
Granville, N. Y.—						
Sea green, weathering	14.00	24.00	30.00	36.00	48.00	60.00
Semi-weathering, green & gray	15.40	24.00	30.00	36.00	48.00	60.00
Mottled purple & unfading gr'n	21.00	24.00	30.00	36.00	48.00	60.00
Red	27.50	33.50	40.00	47.50	62.50	77.50
Pen Argyl, Penn.						
Graduated slate	.....	16.00	23.00	27.00	37.00	46.00
No. 1 clear (smooth text)	7.25–10.50; Albion-Bangor medium, 8.00–9.00; No. 1 ribbon, 8.00–8.50					

(a) Prices are for standard preferred sizes (standard 3/16-in. slates), smaller sizes sell for lower prices.
(b) Prices other than 3/16-in. thickness include nail holes.
(c) Prices for punching nail holes, in standard thickness slates, vary from 50c to $1.25 per square.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Chatsworth, Ga.:
- Crude talc, per ton 5.00
- Ground talc (20-50 mesh), bags 6.50
- Ground talc (150-200 mesh), bags 9.00
- Pencils and steel crayons, gross 1.50– 2.00

Chester, Vt.—Finely ground talc (carloads), Grade A—99-99¾% thru 200 mesh, 8.00–8.50; Grade B, 97-98% thru 200 mesh 7.50– 8.00
1.00 per ton extra for 50-lb. paper bags; 166⅔-lb. burlap bags, 15c each; 200-lb. burlap bags, 18c each. Credit for return of bags. Terms 1%, 10 days.

Clifton, Va.:
- Ground talc (150-200 mesh), in bags 10.00

Emeryville, N. Y.:
- Ground talc (200 mesh), bags 13.75
- Ground talc (325 mesh), bags 14.75

Hailesboro, N. Y.:
- Ground talc (300-350 mesh), in 200-lb. bags 15.00–20.00

Henry, Va.:
- Crude (mine run), bulk 3.50– 4.50
- Ground talc (150-200 mesh) in bags 6.25– 9.50

Joliet, Ill.:
- Ground talc (200 mesh), in bags:
  - California talc 30.00
  - Southern talc 20.00
  - Illinois talc 10.00

Los Angeles, Calif.:
- Ground talc (150-200 mesh), in bags 15.00–25.00

Natural Bridge, N. Y.:
- Ground talc (325 mesh), bags 10.00–15.00

Rock Phosphate

Prices given are per ton (2240 lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 65-70% 3.50– 4.00
Mt. Pleasant, Tenn.—B.P.L. 76-78% 6.75

Ground Rock

(2000 lb.)

Gordonsburg, Tenn.—B.P.L. 65-72% 3.50– 4.00
Mt. Pleasant, Tenn.—B.P.L. 74.4%, without bags 11.80
In paper bags, 13.80; in cotton bags 15.30
Mt. Pleasant, Tenn.—B.P.L. 72% 5.00– 5.50

Florida Phosphate

(Raw Land Pebble)

Mulberry, Fla.—Gross ton, f.o.b. mines
- 68/66% B.P.L. 3.15
- 70% minimum B.P.L. 3.75
- 72% minimum B.P.L. 4.25
- 75/74% B.P.L. 5.25
- 77/76% B.P.L. 6.25

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

Rumney Depot, Bristol and Cardigan, N. H.—Per ton:
- Punch mica, per ton 150.00–240.00
- Mine scrap 22.50
- Mine run 325.00
- Clean shop, scrap 25.00
- Roofing mica 37.50
- Trimmed mica, per ton, 20 mesh, 37.50; 40 mesh, 40.00; 60 mesh, 40.00; 100 mesh, 45.00; 200 mesh 60.00

Spruce Pine, N. C.—Mine scrap, per ton 18.00– 20.00

Trenton, N. J.—Mine scrap, per ton, f.o.b. mines 18.00

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

City or shipping point	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gaging Plaster	Wood Fiber	Gaging White	Plaster Sanded	Cement Keene's	Finish Trowel	—Plaster Board— ⅜x32x 36". Per M Sq. Ft.	⅜x32x 36". Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10'. Per M Sq. Ft.
East St. Louis, Ill.—Special Gypsum Products—Partition section, 4 in. thick, 12 in. wide, and up to 10 ft. 3 in. long, 12c per ft., 21.00 per ton; outside wall section and interior bearing wall section, 6 in. wide, 6 in. thick, and up to 10 ft. 3 in. long, 25c per ft., 30.00 per ton; floor section, 7 in. thick, 16 in. wide, and up to 13 ft. 6 in. long, 17c per ft., 23.00 per ton.													
Grand Rapids, Mich.	.....	.....	.....	9.00	9.00	9.00	.....	.....	.....	.....	15.00	15.00	27.00
Los Angeles, Calif.	.....	7.50	7.50	10.00	12.20	.....	13.20	.....	.....	.....	.....	.....	.....
Medicine Lodge, Kan.	1.40	.....	.....	.....	.....	.....	11.50d	.....	16.00d	.....	.....	.....	.....
San Francisco, Calif.	.....	10.20d	.....	.....	12.90	.....	13.90	.....	.....	.....	.....	.....	.....
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00	25.00g	33.00f

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable). (d) Includes paper bags. (e) Includes jute sacks. (f) "Gyproc," ⅜x48-in. by 5 and 10 ft. long. (g) ⅜x48-in. by 3 to 4 ft. long. (y) Jute sacks, 18.00; paper sacks, 16.00.

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Brandon, Vt.—English pink, cream and coral pink	¶12.50–‖14.50	¶12.50–‖14.50
Cranberry Creek, N. Y.—Bio-Spar, per ton in bags in carload lots, 9.00; less than carload lots, per ton in bags		12.00
Crown Point, N. Y.—Mica Spar		¶9.00–‖12.00
Davenport, Iowa — White limestone, in bags, ton	‖6.00	‖6.00
Middlebrook, Mo.—Red		20.00–25.00
Middlebury, Vt. — Middlebury white		¶9.00–‖10.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags		c5.50
Phillipsburg, N. J.—Royal green granite, in bags, per ton	15.00–18.00	
Stockton, Calif.—"Nat-rock" roofing grits		12.00–20.00
Tuckahoe, N. Y.	7.00	
Warren, N. H. (d)		¶8.00– 8.50

¶C.L. ‖L.C.L. (a) Including bags. (b) In burlap bags, 2.00 per ton extra. *Per 100 lb. (c) Per ton f.o.b. quarry in carloads; 7.00 per ton L.C.L. (d) L.C.L., 9.50–15.00 per ton in 100-lb. bags.

Granular Glasspar

(Chemically Controlled)

Spruce Pine, N. C.—Color, white; analysis, K_2O, 7.20%; Na_2O, 3.70%; SiO_2, 70%; Fe_2O_3, 0.05%; Al_2O_3, 17.50%; per ton, in bulk 10.50

Soda Feldspar

De Kalb Jct., N. Y.—Color, white; pulverized (bags extra, burlap 2.00 per ton, paper 1.20 per ton); 99% thru 140 mesh, 16.00; 99% thru 200 mesh 18.00

Spruce Pine, N. C.—(Chemically controlled.) Color, white; 200 mesh; analysis, K_2O, 5.50%; Na_2O, 5.50%; SiO_2, 68.80%; Fe_2O_3, 0.10%; Al_2O_3, 18.60%; per ton, in bulk 18.00

Potash Feldspar

Keystone, S. D.—Color, white; analysis, K_2O, 12.50%; NaO, 2.25%; SiO_2, 64%; Fe_2O_3, 0.03%; Al_2O_3, 20%, pulverized, 99% thru 200 mesh; in bags, 16.00; bulk 15.00
Crude, in bags, 7.50; bulk 6.50

East Liverpool, Ohio — Color, white; analysis, K_2O, 11.00%; Na_2O, 2.25%; SiO_2, 68.00%; Fe_2O_3, .08%; Al_2O_3, 17.95%, pulverized, 99% thru 200 mesh, in bags, 22.00; in bulk 20.00

Erwin, Tenn.—White; analysis, K_2O, 10.50%; Na_2O, 2.75%; SiO_2, 67.75%; Fe_2O_3, .08%; Al_2O_3, 18.00%, pulverized, 98% thru 200 mesh, in bags, 16.00; bulk 15.00
Crude, in bags, 7.50; bulk 6.50

Spruce Pine, N. C.—(Chemically controlled.) Color, white; 200 mesh; analysis, K_2O, 11.30%; Na_2O, 2%; SiO_2, 67%; Fe_2O_3, 0.10%; Al_2O_3, 18.60%; per ton, in bulk 18.00

West Paris, Me.—(Chemically controlled.) Color, white; 200 mesh; analysis, K_2O, 11.20%; Na_2O, 3.20%; SiO_2, 65.70%; Fe_2O_3, 0.09%; Al_2O_3, 19.20%; per ton, in bulk 19.00

Rochester, N. Y.—Color, white; analysis, K_2O, 12.68%; Na_2O, 2.99%; SiO_2, 64.37%; Fe_2O_3, 0.06%; Al_2O_3, 19.51%; pulverized 98% thru 200 mesh; in bags, 20.00; bulk 18.00

Cement Drain Tile

Graettinger, Iowa — Drain tile, per foot; 5-in., .04½; 6-in., .05½; 8-in., .09; 10-in., .12½; 12-in., .17½; 15-in., .35; 18-in., .50; 20-in., .60; 24-in., 1.00; 30-in., 1.35; 36-in. 2.00

Grand Rapids, Mich.—Drain tile, per 1000 ft.

4-in.	36.00
6-in.	66.00
8-in.	100.00
10-in.	150.00
12-in.	210.00

Chicken Grits

Cypress, Ill.—(Agstone)	1.15
Chico, Tex.—Hen size and Baby Chick, packed in 100-lb. sacks, per 100-lb. sack, f.o.b. Chico	1.00
Davenport, Iowa—High calcium carbonate limestone, in bags, L.C.L., per ton	6.00
El Paso, Tex.—(Limestone), per 100-lb. sack	.75
Los Angeles, Calif.—(Gypsum), per ton, including sacks	7.50– 9.50
Middlebury, Vt.—Per ton (a)	10.00
Piqua, Ohio—(Pearl grit), No. 1 and No. 2	1.00– 4.00
Port Clinton, Ohio—(Gypsum), per ton	6.00
Warren, N. H.	8.50– 9.50
Waukesha, Wis.—(Limestone), per ton	7.00
West Stockbridge, Mass.	¶7.50–‖9.00

(a) F.o.b. Middlebury, Vt. ¶C.L. ‖L.C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis. (at plant)	9.50
Dayton, Ohio	12.50–13.50
Detroit, Mich.	12.00¶–15.50*
Flint, Mich.	15.50‡
Grand Rapids, Mich.	14.00
Iona, N. J.	10.50–12.00
Jackson, Mich.	13.00
Madison, Wis.	12.50†
Milwaukee, Wis.	12.00–13.00*
Minneapolis and St. Paul, Minn.	9.50*
Mishawaka, Ind.	11.00
New Brighton, Minn.	9.00
Pontiac, Mich.	10.00–11.00
Saginaw, Mich.	13.50
Sebewaing, Mich. (at yard)	12.50
Syracuse, N. Y.	18.00–20.00
Toronto, Canada	11.00–‡13.00*
Wilkinson, Fla.—White, 10.00; buff.	14.00
Winnipeg, Canada	15.00

*Delivered on job. †Less 50c dis. per M 10th of month. ‡5% disc., 10 days. §Delivered in city. ¶To 13.00.

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point.

City or shipping point	
Camden, N. J.: 8x8x16, each	.18
Chicago, Ill.:	
8x 8x16. Each	.21a
8x12x16. Each	.28a
Columbus, Ohio: 8x8x16	14.00§–16.00‡
Graettinger, Iowa	.18– .20
Indianapolis, Ind.	.10– .12‡
Lexington, Ky.:	
8x8x16	‡18.00*
8x8x16	§16.00*
Los Angeles, Calif.:	
4x8x12	4.50*
4x6x12	3.90*
4x4x12	2.90*

*Price per 100 at plant.

†Rock or panel face.

‡Face. §Plain. (a) Rock face.

Cement Roofing Tile

Prices are net per square, carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Cicero, Ill.—French, Spanish, Closed End Shingle, and English Shingle, per sq.	9.50–13.00
Indianapolis, Ind.—9x15-in.	Per sq.
Gray	10.00
Red	11.00
Green	13.00
Lexington, Ky.—8x15, per sq.:	
Red	15.00
Green	18.00
Longview, Wash.:	
4x6x12-in., per 1000	55.00
4x8x12-in., per 1000	65.00

Cement Building Tile

Chicago District (Haydite):	
8x 4x16, per 1000	140.00
8x 8x16, per 1000	200.00
8x12x16, per 1000	300.00
Lexington, Ky.:	
5x8x12, per 1000	55.00
4x5x12, per 1000	35.00
Longview, Wash. (Stone Tile):	
4x6x12, per 1000, at plant	54.00
4x8x12, per 1000, at plant	64.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Camden & Trenton, N. J.	17.00	
Chicago District "Haydite"	14.00	
Ensley, Ala. ("Slagtex")	10.00a	
Longview, Wash.	16.50	22.00– 40.00
Milwaukee, Wis.	13.00	20.00– 36.00
Omaha, Neb.	18.00	30.00– 40.00
Prairie du Chien, Wis.	14.00	22.50– 25.00
Rapid City, S. D.	16.00	30.00

(a) 13.00 delivered on job in city.

Fullers Earth

Prices per ton in carloads, f.o.b. Florida shipping points. Bags extra and returnable for full credit.

16– 30 mesh	20.00
30– 60 mesh	22.00
60–100 mesh	18.00
100 mesh and finer	9.00

Joliet, Ill.—All passing 100 mesh. Price per ton, f.o.b. Joliet, including cost of bags 24.00

Stone-Tile Hollow Brick

Prices are net per thousand, f.o.b. plant.

	No. 4	No. 6	No. 8
Albany, N. Y.*†	40.00	60.00	70.00
Asheville, N. C.	35.00	50.00	60.00
Atlanta, Ga.	29.00	42.50	53.00
Brownsville, Tex.	.....	53.00	62.50
Brunswick, Me.†	40.00	60.00	80.00
Charlotte, N. C.	35.00	45.00	60.00
De Land, Fla.	30.00	50.00	60.00
Farmingdale, N. Y.	37.50	50.00	60.00
Houston, Tex.	35.00	45.00	60.00
Jackson, Miss.	45.00	55.00	65.00
Klamath Falls, Ore.	65.00	75.00	85.00
Longview, Wash.	.....	55.00	64.00
Los Angeles, Calif.	29.00	39.00	45.00
Mattituck, N. Y.	45.00	55.00	65.00
Medford, Ore.	50.00	55.00	70.00
Memphis, Tenn.	50.00	55.00	65.00
Mineola, N. Y.	45.00	50.00	60.00
Nashville, Tenn.	30.00	49.00	57.00
New Orleans La.	35.00	45.00	60.00
Norfolk Va.	35.00	50.00	65.00
Passaic, N. J.	40.00	52.50	70.00
Patchogue, N. Y.	.....	60.00	70.00
Pawtucket, R. I.	35.00	55.00	75.00
Safford, Ariz.	32.50	48.75	65.00
Salem, Mass.	40.00	60.00	75.00
San Antonio, Tex.	37.00	46.00	60.00
San Diego, Calif.	35.00	44.00	52.50

Prices are for standard sizes—No. 4, size 3½x4x12 in.; No. 6, size 3½x6x12 in.; No. 8, size 3½x8x12 in. *Delivered on job. †10% discount.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted

Culvert and Sewer	4-in.	6-in.	8-in.	10-in.	12-in.	15-in.	18-in.	20-in.	22-in.	24-in.	27-in.	30-in.	36-in.	42-in.	48-in.	54-in.	60-in.
Grand Rapids, Mich. (b)																	
Sewer	.....	.12	.18	.27½	.35	.47	.92½	1.11	.....	1.66½	2.47	2.73½	.....	.....	.....	.....	.....
Culvert	.....	.....	.....	.57	.67	.93	1.20	.....	.....	1.80	2.10	2.25	3.35	4.00	5.60	6.90	7.85
Indianapolis, Ind. (a)	.....	.....	.....	.75	.85	.90	1.15	.....	.....	1.60	.....	2.50	.....	.....	.....	.....	.....
Milwaukee, Wis.	Cast stone window sills, 5 in. x 5½ in., 60c per lineal ft.																
Newark, N. J. (d)	.....	.....	.....	.....	.90	1.15	1.50	.....	.....	1.85	2.35	2.76	3.77	4.93	6.21	7.66	9.28
Unreinforced	.....	.16	.25	.37	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norfolk, Neb.	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Wahoo, Neb. (c)	.....	.....	.....	.....	.....	.85½	.....	1.14	.....	1.81	.....	2.47	3.42	4.13	5.63	6.49	7.31

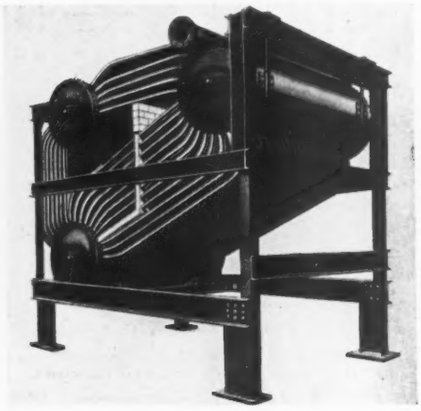
(a) 24-in. lengths. †21-in. diam. (c) Reinforced, 15.40 per ton, f.o.b. plant. (d) Reinforced, 21-in., 1.69; unreinforced, 21-in., 1.26; 5% cash discount.

New Machinery and Equipment

New Boilers Designed for Limited Space

THE ERIE CITY IRON WORKS, Erie, Penn., has recently developed a new "C" series of 3-drum boilers, available in a wide range of sizes from 80-hp. up for steam working pressures up to 350 lb.

The design is adapted from the company's 3-drum boiler, and embodies most of the features of this earlier product, except that it has been changed in many details to provide an economical unit where space is an important consideration.



One of the new 3-drum boilers with horizontal steam header

The quality of producing slightly superheated steam, a feature of the 3-drum boiler, is retained in this low headroom boiler by the use of a horizontal steam header or manifold which, as shown in the illustration, is connected to the rear steam drum by a number of superheating tubes. Slightly superheated steam is discharged into the main steam line horizontally from the end of this header, which arrangement, it is stated, reduces the headroom considerably over that required for the conventional top steam outlet.

The customary rear brick wall has been eliminated and substituted by well insulated removable plates. Thus easy access can be had to the entire rear of the boiler by removing these plates.

The baffles are arranged in a manner which, it is clamied, effects the hot gases over every inch of heating surface in the boiler, thus gradually lowering their temperature until in the last pass an insulated steel plate rear wall is adequate.

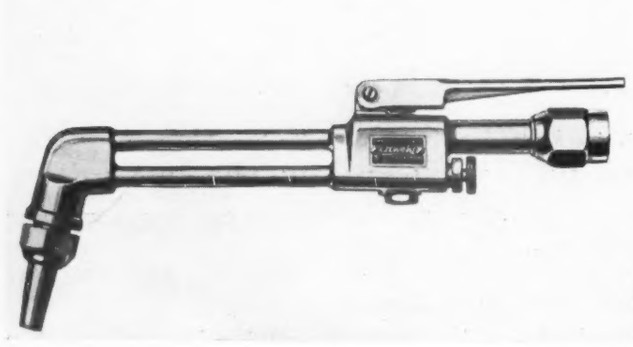
Many of the smaller sizes are designed to be shipped as a complete unit, thus reducing installation costs. The view here, eliminating the four short detachable legs, shows how this unit may be shipped.

New Attachments for Welding Blowpipe

THE OXWELD ACETYLENE CO., New York City, has recently introduced new accessories for its Type W-17 welding blowpipe which, it is claimed, now makes this blowpipe capable of doing almost any type of work which may be required of an oxy-acetylene blowpipe.

The new Type CW-17 cutting attachment, it is said, differs radically from any such attachment which has previously been manufactured. A long handle is used for operating the cutting oxygen valve, and when this handle is not in use, it can be pulled forward parallel to the tubes so that the whole attachment may be carried around in the operator's pocket. The injector for the heating flames is contained in the attachment and it has the same style stem lock nut as the welding head for the blowpipe. At the rear of the attachment near the bottom is an adjusting screw, so that the oxygen for the heating flames may be regulated by the operator's thumb and forefinger while the blowpipe is in operation. The attachment is joined to the blowpipe handle in exactly the same manner as a welding head, that is, the lock nut can be tightened by hand and no wrench is necessary to join the attachment to the handle.

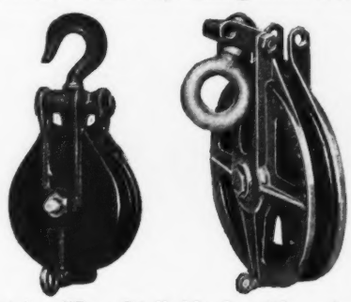
Another accessory just introduced for use with the W-17 welding blowpipe is the W-17 and W-15 adaptor, which makes it possible to use any of the welding heads available for the Oxweld W-15 sheet metal welding blowpipe with the Type W-17 welding blowpipe handle. Because of this, it is claimed that the W-17 welding blowpipe may be used on work ranging from the lightest type of welding to heavy general welding work. The end of the adaptor which fits on to the W-17 blowpipe handle is similar to the rear end of a W-17 welding head. The adaptor contains passages for the oxygen and acetylene which fit tightly against the passages in the blowpipe handle. The other end of the adaptor is exactly the same as the end of a W-15 sheet metal blowpipe handle, so that no more adjustment is required in attaching the W-15 welding head to the adaptor than to a W-15 handle.



Above is a W-17 blowpipe handle with adaptor and W-15 welding head. At the left is a CW-17 cutting attachment in operating position

Steel Dragline Block Now Made in Wide Range of Sizes

SAUERMAN BROS., Inc., Chicago, Ill., has added to its line of steel dragline blocks a "Durolite" block with only 6-in. sheave diameter, making these blocks now available in a range from 6 to 42 in.



A 6-in. "Durolite" block with swivel hook attachment (left) and a 10-in. block (right)

These dragline blocks were first put on the market about four years ago in standard sizes of 12 to 30 in., but development of larger coal-storage and earth-moving power scraper machines has caused the manufacturer to add blocks of 36 and 42 in. diameter, and small "Durolites" with 10,- 8- and 6-in. sheaves for excavating where absolute minimum weight is the

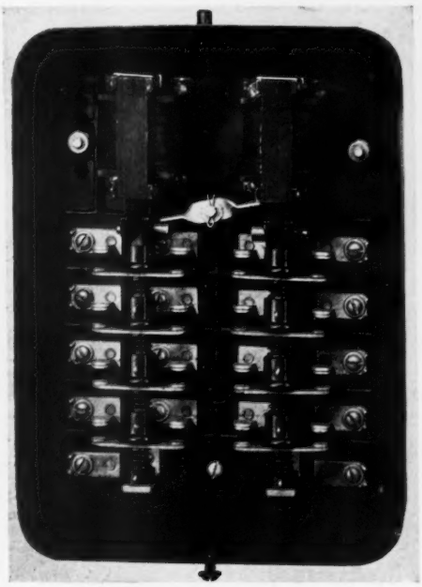
essential requirement.

According to the manufacturer, "Durolite" blocks are built of light and tough special heat-treated alloy steel, which it is claimed combines great strength with light weight. The flange of the sheave is protected by a heavy bead on the housing, eliminating, it is claimed, any possibility of fouling and protecting the cable. The block can be opened up to receive or to remove the cable by simply removing one pin from the yoke. Lubrication is provided through the sheave, and not through a center-bored axle, and a grease reservoir is provided around the bearing.

The blocks may be had with either bronze-bushed or roller bearings, and with swivel hook, swivel rope-bearing eye or swivel pin-bearing eye attachments.

Control for Reversing Small Motors

THE GENERAL ELECTRIC CO., Schenectady, N. Y., announces a new reversing equipment for small motors, designated as CR-7009-B-19. This switch is designed to handle squirrel-cage motors



New magnetic reversing switch

rated 1½-hp. at 110 volts, and 2-hp. at 220, 440, 550 and 600 volts, 25 to 60 cycles.

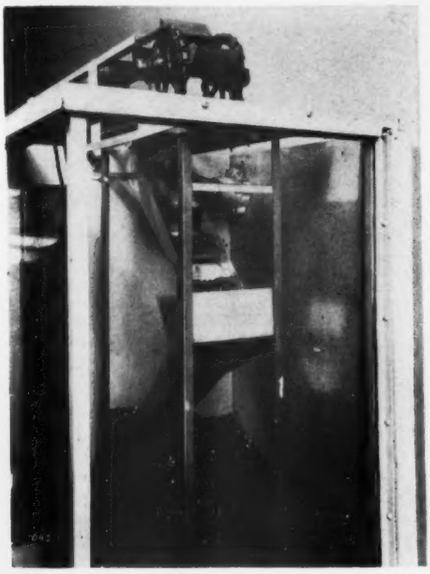
The switch consists of two contactors mechanically interlocked and having four sets of contacts and terminals. Three of these contact sets are for power circuits and the remaining one is for the holding circuit of the coil. The terminals are front connected and are marked to facilitate wiring.

The equipment is mounted on a compound base for mounting in an enclosing case. The case is suitable for wall mounting and has a removable cover and knockouts for the incoming and outgoing leads. A three-button ("Forward" "Reverse" "Stop") push-button station is recommended for a control switch.

Reducing Segregation

THE ROBINS Conveying Belt Co., New York City, has introduced a device that is intended to reduce segregation of concrete aggregates. The apparatus, essentially, consists of two separate pieces of equipment, one for filling a bin or silo and the second for withdrawal from a similar container.

The former is known as the Adams "Avalanche" chute and functions to ease the material into a bin and spread the material evenly over the area. This is accomplished by a series of "passes" and retarding angle plates that cause the material to flow in a series of smoothly moving avalanches in which a mass of material moves forward as



The "Avalanche" chute which functions to ease the material into a bin

a whole without the individual pieces rolling or rubbing against each other.

The withdrawal chute is to get the material out of a bin with a uniform mixture of sizes. The withdrawal is accomplished from the top in this device and is said to make a uniform mixture and without excessive grinding of the material being withdrawn.

The picture shows a bin with no special withdrawal chute and one provided with an Adams withdrawal chute. At the time the photograph was taken both model bins were

The withdrawal chute (right) takes material out of the bin in a uniform manner

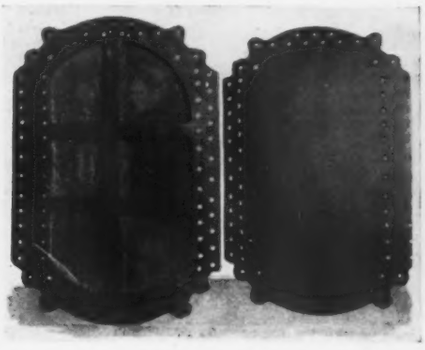
open and their content was being withdrawn at the same rate. Note the uniformity of sizes remaining in the bin.

New Type of Dipper Door Reinforcement Casting

THE AMERICAN MANGANESE Steel Co., Chicago Heights, Ill., has recently introduced a new type of dipper door reinforcement casting.

This casting, made of Amsco manganese steel, and designated as the Meyer "Turtle Back" reinforcement unit, can be applied to any dipper door that is flat inside and that has not become distorted. The unit is convex to the work, and of ample size and strength to protect the door and mechanism from severe shock and distortion. It is designed to reduce wear and eliminate the bothersome door and latch troubles caused by falling rocks, the shock from which permanently distorts door sheets.

According to the description, it is made to suit all dipper sizes, and is quickly and easily secured to the inside of the door so as not to interfere with door braces and latch mechanisms.



Illustrating the new type of dipper door reinforcement casting

News of All the Industry

Incorporation

Tomkins-Rockwall Corp., incorporated in New Jersey, $125,000. To manufacture gypsum products.

Gezon-Battjes Gravel Co., Grand Rapids, Mich., $50,000. To produce sand and gravel.

Transit Mix Concrete Co. of Texas, Houston, Tex., $75,000. L. D. and Mrs. Abbie McKaughan, J. P. Coulter and J. S. Henderson.

Crystalline Rock Products Corp., New York City, 5000 shares common. To produce rock, limestone, sand, etc.

Detroit Slag and Dock Co., Penobscot Bldg., Detroit, Mich., $400,000. To produce stone, sand, gravel and slag.

The Silica Co. of California, Ltd., San Francisco, Calif., 2000 shares. C. L. Gorr and F. P. Verdier.

Cast Stone Co., Inc., Columbus, Ohio, 600 shares of no par value. L. F. Dillman, W. H. Peterson, D. E. Hinds and F. S. Crooks, 20 South Third St., Columbus, Ohio.

Frank C. Jordan, Inc., Elkhart, Ind., $10,000. Frank C. Jordan, Ada B. Jordan and Lorenzo D. Hall. To produce gravel, cement products and construction materials.

The Sand Man, Inc., Cranston, R. I., 100 shares common of no par value. To produce sand and stone. Thomas F. Minutilla, 96 Bluff Ave., Cranston; Joseph Sauner and Julia C. Minutilla.

Producers Core Sand Corp., Michigan City, Ind., 300 shares of no par value. John N. Bos, Otto Lange, A. O. Ohlemacher, William H. Baker and William B. Manny.

Atlas Lime and Chemical Co., San Francisco, Calif., 200,000 shares common, $100 each. To produce and sell limestone products. Ernest W. Harker, president.

Westerly Pink Quarries, Inc., Westerly, R. I., 100 shares no par common stock. To operate quarries. Orlando R. Smith, 124 Granite St., Westerly; Franklin C. Smith, Isaac C. Smith and Edward W. Smith.

Monroe Materials Co. (Illinois corporation) incorporated in Indiana with capital stock of 64 shares. To produce sand, gravel, stone and other materials. Indiana agent, William Westergren, Miller, Ind.

California Lime Products Co., Ltd., Sacramento, Calif., $2,000,000, consisting of 200,000 shares common with a par value of $10 each. B. C. Clark, president; R. E. Mittelstaedt, vice-president; R. L. Hollingsworth, general manager, and G. T. Gunston, Harry A. Armstrong, Cyril Maurer and W. E. Kleinsorge, directors.

Quarries

Hastings, Minn. The Nininger Stone Quarry, operated for the past two years by the Fegles Construction Co. of Minneapolis, Minn., builders of the government dam here, has been abandoned by that company as the result of the completion of all rock work on the dam.

Le Grand, Ia. The Northwestern Quarry here has been closed down for the season. The Le Grand Limestone Co., however, is to continue operations, getting out road material and ballast, and stripping operations will be carried on until the cold weather sets in

Wilson Limestone Co., Menomonie, Wis., started operations recently and will supply crushed limestone for Highway No. 29 south of Wilson. It is expected that 2500 cu. yd. or more will be used for this project. The company has other contracts for supplying road building material, and it is also supplying limestone for agricultural purposes.

California Lime Products Co., Ltd., incorporation notice of which appears in this issue, will have its head offices in the Bank of Italy Building in Sacramento. The company will manufacture as its principal product CO_2 ice, or what is known to the trade as dry-ice, which has been brought into commercial use as a refrigerant during the past eight years. The new commodity is made from lime rock which is taken in its natural state from the company's quarry at Gorge Station on the main line of the Southern Pacific railway, 60 miles east of Sacramento. After being quarried, crushed and screened the rock will be shipped to the plant to be erected in Sacramento, which will have an initial capacity of 50 tons of ice per day. Rotary kilns and other manufacturing equipment will be erected on the plant site. By burning the rock, carbon dioxide gas is secured, which is cleansed of all impurities and then compressed to a liquid and thence to solid material, or CO_2 ice.

Sand and Gravel

Warner Co., Philadelphia, Penn., is planning the erection of a one-story machinery and equipment repair shop.

Cherokee Sand and Gravel Co., Knoxville, Tenn., held "open house" recently for Knoxville business men and women who visited the operation and were shown the entire process of producing sand and gravel.

Foley Bros., St. Paul, Minn., incurred damages estimated at around $5000 when a fire broke out in the company's gravel plant at Darling recently. The fire started from a motor at the top of the plant and destroyed much valuable machinery.

Earlville, Ia. A new gravel pit has been opened near the Michael Gudenkauf farm. The deposit covers an area of one acre and it is said that it has enough material to surface the roads in the vicinity for some time.

Eau Claire Sand and Gravel Co., Eau Claire, Wis., is planning a new mineral aggregates plant to replace the one burned in September. The company has also let contracts for a new sand drying plant at its No. 3 plant in Chippewa Falls, Wis., to cost about $40,000.

Gilley Bros., Ltd., New Westminster, B. C., reports that October was a good month for the sale of gravel, rock and building materials. The large jetty project under way at Steveston is helping to keep the company's big rock-crushing plant at Pitt Lake operating, and the new Sea Island airport has contributed to orders being filled by the Mary Hill gravel pit.

Deep River, Ia. A vein of gravel about 12 ft. deep and running about one-fourth of a mile in length has been discovered on the E. W. Elliott farm northwest of Deep River. Mr. Elliott has had the gravel tested and it has been found of good quality. The pit is near the railroad tracks, which is a strong point in its favor, and it is believed that it will be opened next spring to produce gravel for road purposes.

Cement

Aetna Portland Cement Co., Detroit, Mich., has purchased 113 acres of land known as the James E. Munger farm in Midland County, Mich.

Universal Atlas Cement Co., Chicago, Ill., announces the removal of its Des Moines offices to the third floor of the Old Colony Bldg. at Tenth St. and Grand Ave., Des Moines, Ia.

Three Forks Portland Cement Co., Trident, Mont., recently entertained at luncheon the Montana Society of Engineers. Following the luncheon A. D. Burkett spoke on quarrying methods and the production of portland cement, after which the visitors inspected the quarries and mill of the cement company.

Portland Cement Association, Chicago, Ill., has recently published a leaflet, entitled "How Much Do Clean Streams Cost?" which is a reprint of an article written by Dr. William D. Hatfield, superintendent of the Decatur Sanitary District (Illinois). This pamphlet contains a brief elementary discussion of the costs involved in the construction and operation of a sewage disposal plant, and copies may be secured from the association's headquarters, 33 West Grand Ave., Chicago.

Gypsum

United States Gypsum Co., Chicago, Ill., has designated E. R. Hill, East Chicago, Ind., as its Indiana agent.

Standard Gypsum Co., San Francisco, Calif. Eleven thousand tons of crude gypsum was discharged at the Long Beach plant of the company recently by the freight steamer "S. A. Perkins," which arrived in port from San Marcos Island, Mexico.

Cement Products

Beeville La More Tile Co., it is reported, has moved its concrete tile manufacturing plant from Three Rivers to Beeville, Tex.

The Federal Cement Tile Co., Chicago, Ill., which operates a plant at Hammond, Ind., has acquired the American Cement Tile Manufacturing Co., with plants in Lincoln, N. J., Wampum, Penn., and Birmingham, Ala.

Ware, Mass. A fire of unknown origin damaged the building at Giard's cement block yard here recently. It is stated that losses in machinery for making cement blocks and damages to the building amounted to about $200.

Concrete Unit Mfg. Co., Industrial Bldg., Detroit, Mich., is planning the operation of a plant at Leach Road and on the line of the Grand Trunk Railroad, for the production of structural precast concrete units. It is estimated that the plant will cost over $40,000 with equipment.

Miscellaneous Rock Products

The International Agricultural Corp., New York City, is reported to have plans in progress for a new phosphate plant at Mulberry, Fla.

Barium Products, Ltd., will start the construction of an addition to its plant on the state highway near Modesto, Calif., about January 1. The addition will be used primarily for the manufacture of by-products of barium.

Rock Wool Products Co., Wabash, Ind., recently organized with a capital of $50,000 by Charles and Clyde Latchem, both of Wabash, is planning the erection of a mill at Wabash for the manufacture of special insulating products, to cost over $35,000 with equipment.

Consolidated Mining and Smelting Co., Trail, B. C., is starting operations near Paris, Idaho, in Bear Lake county, for the development of phosphate claims on a large scale, according to R. B. Shelledy and J. E. Miller, representatives of the company. The phosphate rock will be shipped as mined, without crushing or drying, to the new $10,000,000 fertilizer plant now being erected by the company at Trail, where it will be made into treble superphosphate fertilizer.

Personals

Joseph F. Gorman, vice-president of the Federal Lime and Stone Co., Cleveland, Ohio, is a candidate for the office of county commissioner.

Cecil H. Smith of the Arrow Sand and Gravel Co., Columbus, Ohio, was married to Miss Bernice Ott on Saturday, October 18.

Erwin M. Lurie, civil engineer, and for the past nine years assistant to the commissioner, has been promoted to the position of acting commissioner of the Associated Metal Lath Manufacturers, Chicago.

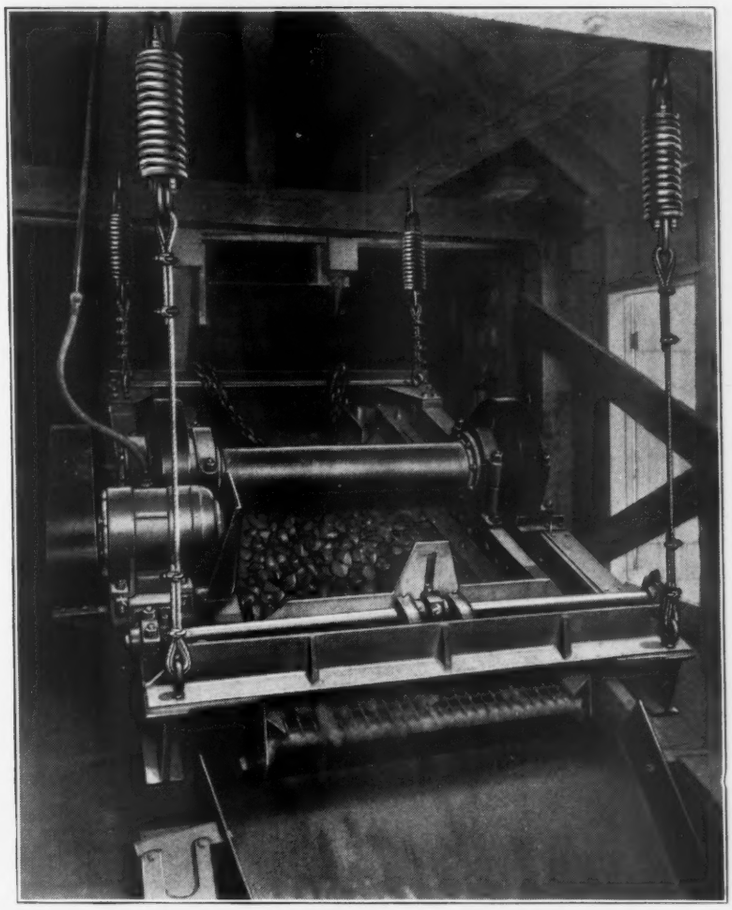
Henry Koch and **Bert Koenig** of the Koch Sand and Gravel Co., Evansville, Ind., recently served on the committee to arrange for the observance of Disaster Preparedness Day at Evansville.

Peter Hitchcock, 14-year-old son of Charles W. Hitchcock, treasurer of the Federal Lime and Stone Co., Cleveland, Ohio, was seriously injured in a fall while horseback riding. Reports from the Cleveland Clinic, where the boy was taken, are that his condition is improving.

Emil Hansen was elected treasurer and general manager of the Paragon Plaster Co., Oakfield, N. Y., succeeding William K. Squier, who passed away recently. **Charles T. Woodworth** was elected secretary of the company and Andrew H. Mercer, Jr., assistant treasurer.

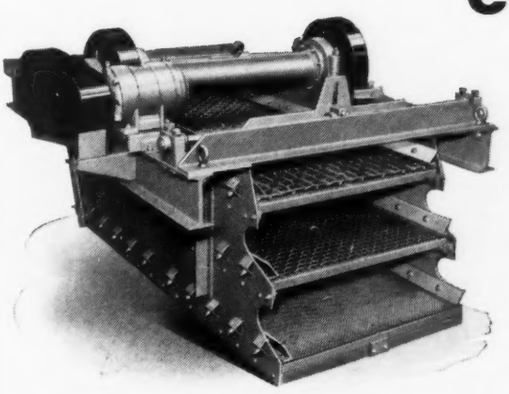
L. B. Mead of Indianapolis, Ind., has been appointed assistant industrial manager of the northwest district of the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn. **Wm. J. Morgan** becomes Indianapolis manager for the firm.

Lee F. Adams, commercial engineer of the General Electric Co. at Schenectady, N. Y., has been awarded the Manufacturers Medal and Purse for 1930, given under the James H. McGraw Award, which recognition, it is stated, is the result of "out-



Positive

Mechanically Produced Motion—equal over entire screen surface



Allis-Chalmers vibrating screens are built with one, two and three decks in sizes 3′ x 6′ and 4′ x 8′ to suit conditions of operation.

. . . . The result, large capacity and a clean product. Allis-Chalmers Vibrating Screens have self-aligning, anti-friction bearings with positive dust seals, alemite lubricated; large eccentric shafts; and all rotating parts fitted with safety guards. The vibrating mechanism can be removed without disturbing the screen body or supporting frame. Screen sections are easily changed and are reversible, end for end. They are also interchangeable. The screening angle is adjustable. Centrifugal Vibrating Screens are built with single, double or triple decks. The liberal clearance between decks facilitates spouting and the changing of screen surfaces. . . . Details of construction and other data on vibrating screens are given in Bulletin 1470-A. May we send you a copy?

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

When writing advertisers, please mention ROCK PRODUCTS

standing and unselfish service to the manufacturing branch of the electrical industry."

J. J. Kelley, who as stated in the October 11 issue of ROCK PRODUCTS was transferred to the Oakfield, N. Y., plant of the United States Gypsum Co., was given a farewell banquet by employes of the Ohio plant, and was presented with a wrist watch as a token of appreciation from his fellow workers.

William Ogden, who has been manager of the Manufacturers' Division of the American Road Builders' Association, Washington, D. C., has resigned. The offices of the Manufacturers' Division will be continued at the headquarters of the American Road Builders' Association, and any communication or matters concerning the division may be sent to Charles Upham, executive-secretary of the Manufacturers' Division, American Road Builders' Association, 938 National Press Bldg., Washington, D. C.

C. F. Messinger, vice-president and general sales manager of the Chain Belt Co., Milwaukee, Wis., has been elected general manager and **H. S. Greene** has been elected to succeed to the sales managership. The following other changes have been made in the executive personnel of this company: **Brinton Welser,** formerly secretary, was elected a vice-president and a director; **J. C. Merwin** was re-elected as vice-president; **A. R. Abelt** was named secretary and will continue in charge of chain sales, and **W. H. Brandt,** formerly assistant secretary, was made assistant to the president.

Scott Turner, director of the United States Bureau of Mines, was recently heard over the wireless from Louisville, Ky., speaking on the subject of the Government's interest in the prevention of accidents in the mining and allied industries. He also delivered an address before the National Safety Council as part of the general program at the annual convention at Pittsburgh, the subject of this address being the Holmes safety certificate of honor. On October 14 Mr. Turner delivered an address on the "Conservation of Natural Gas in Relation to Some Recent Developments" at the opening exercises of the general session of the American Gas Association at Atlantic City, N. J.

Obituaries

William Piez, European correspondent of Link-Belt Company, and a brother of Charles Piez, chairman of the board, Link-Belt Company, died at Brussels, Belgium, on November 2nd after a week's illness.

Manufacturers

Fuller Lehigh Co., Fullerton, Penn., has moved its Cincinnati office from the Traction Bldg. to Carew Tower, Cincinnati. H. E. Martin will continue as manager of this office.

Merco Nordstrom Valve Co., San Francisco, Calif., has opened an office in Charleston, West Va., at 304 Capitol St., under the management of H. D. Ruos.

Chain Belt Co., Milwaukee, Wis., has appointed two new distributors in the construction equipment field, namely, Alabama Machinery and Supply Co., Montgomery, Ala., and the Concrete Products Sales Co., Ltd., Oakland, Calif.

The Owen Bucket Co., Cleveland, Ohio, has opened a new branch office and warehouse in New York, located at 36-25 Twenty-second St., Long Island City. The new office is in charge of Frank W. S. Elmes.

Universal Power Shovel Co.—division of the Unit Corporation of America, Milwaukee, Wis., has appointed a new dealer in the eastern territory. The Tractor and Equipment Co., 520 Passaic Ave., Newark, N. J., will handle the company's products in that territory.

Combustion Engineering Corp., New York City, has received a contract from the West Virginia Hydro-Electric Co., a subsidiary of the Union Carbide and Carbon Corp., amounting to approximately $500,000 and covering two pulverized coal-fired boiler units, to be installed at Boncar, W. Va.

Union Carbide Corp., New York City, has acquired the assets of International Oxygen Co. and its subsidiaries, with plants in Newark, N. J., Verona, Penn., Tariffville, Conn., and Buffalo, N. Y. The International Oxygen Co. makes oxygen and acetylene gas and welding apparatus.

Lincoln Electric Co., Cleveland, Ohio, has appointed W. S. Stewart, formerly in charge of the Pacific Coast offices of the company, as district manager in charge of the Cleveland territory with offices at the factory, on Coit Road and Kirby Ave.

Hercules Motors Corp., Canton, Ohio, announces a change in the address of its European representatives. Hereafter the headquarters of the Automotive Products Co., distributors of Hercules engines and power units for Great Britain and continental Europe, will be located at Brock House, Langham St., London, W. 1, England.

Cutler-Hammer, Inc., Milwaukee, Wis., announces that its Philadelphia sales office is now located in new quarters on the tenth floor of the new Terminal Commerce Bldg., 401 North Broad St., Philadelphia. The new quarters also include warehouse facilities where a stock of the more popular C-H electric control apparatus will be carried. F. J. Burd is Philadelphia district manager.

Link-Belt Co., Indianapolis, Ind., announces the appointment of Warren Maxwell as superintendent of the Dodge Works, to replace F. J. Oakes, deceased. Mr. Maxwell joined the Link-Belt organization in 1922, entering the sales department. In January, 1929, he was made assistant superintendent, from which position he has just been promoted.

The Tinius Olsen Testing Machine Co., Philadelphia, Penn., has awarded a contract for the erection of a six-story additional building for storage and assembling purposes, as well as for an enlarged erecting floor with increased crane way for the erection of extremely large testing and balancing machine equipment. The new addition completely equipped will represent an expenditure of approximately $75,000.

Palmer-Bee Co., Detroit, Mich., announces the opening of district offices in Buffalo at Room 333, Ellicott Square Bldg., C. E. Jeremias, district manager; in Pittsburgh at Room 508, Farmers Bank Bldg., C. E. Musselman, district manager; in Cleveland at Room 1056, Rockefeller Bldg., F. B. Barkwell, district manager; a southern office at Room 1210, Reynolds Bldg., Winston-Salem, N. C., E. S. Davidson, district manager; and an office in Philadelphia in the Bulletin Bldg., in charge of S. T. Transeau.

Western Wheeled Scraper Co., Aurora, Ill., announces the transfer to St. Louis of R. A. Ruble from the Atlanta, Ga., office. Mr. Ruble takes the place resigned by J. A. Cordeal, who has been in charge of the St. Louis branch and who retires after nearly 40 years of service. The warehouse stock of Western tools, machines and repairs in Atlanta will be handled through the warehouse of the Austin-Western Road Machinery Co., 389 Whitehall St., Atlanta, and R. L. Ruble will remain in charge of the Atlanta office.

American Hoist and Derrick Co., St. Paul, Minn., announces the removal of its Dayton office to Indianapolis, Ind. The Dayton office at 254 Fourth St. Arcade has been closed and a new office opened in Indianapolis at 703 New City Trust Bldg. I. R. Bailey and Wm. M. Schoen, who have been stationed at Indianapolis for many years, will be at the new office. Mr. Bailey is in charge of American revolver sales and Mr. Schoen represents the entire American line of hoisting machinery.

General Cable Corp., Rome, N. Y., announces that effective October 1, the sales, manufacturing and accounting operations of the following companies which have operated as separate divisions, will be combined into a single organization—General Cable Corporation: A-A Wire Co., American Insulated Wire and Cable Co., Atlantic Insulated Wire and Cable Co., Detroit Insulated Wire Co., Dudlo Mfg. Co., Peerless Insulated Wire and Cable Co., Phillips Wire Co., Rome Electrical Co., Rome Wire Co., Safety Cable Co., Standard Underground Cable Co. and Southern States Cable Co.

National Carbon Co., Inc., Carbon Sales Division, Cleveland, Ohio, announces that beginning November 1, 1930, it will distribute and sell the entire line of "Gredag" lubricants manufactured by the Acheson Graphite Corp., a unit of the Union Carbide and Carbon Corp. As in the case with its industrial carbon products, sales and technical service on all Gredag lubricants will be available at the branch offices and service plants of the Carbon Sales Division located in New York City, Pittsburgh, Birmingham, Chicago and San Francisco.

Gears and Forgings, Inc., Cleveland, Ohio, with the merging of its Ford City and Pittsburgh plants, announces the concentration of all its heavy gear and special machinery production at the Ford City plant. The Ford City plant now offers unusual facilities for the manufacture of heavy gears, special machinery, steel mill equipment, strip coilers, sheet metal drives, bridge operating equipment, etc. Complete facilities for maintenance gear work are in operation at all the company's plants in Chicago, Cleveland and Ford City. For the convenience of customers in the Pittsburgh district the Pittsburgh branch office will remain at 2818 Smallman St.

Hercules Motors Corp., Canton, Ohio, has featured heavy-duty power for road-building and maintenance equipment of all types, as well as for trucks and buses of various kinds and sizes, in its exhibit at the recent International Exposition held this year at Washington, D. C., from October 7 to 10, inclusive, in connection with the Sixth Permanent International Road Congress. An extensive and representative exhibition of the company's heavy-duty engines were displayed in space No. 10 in the auditorium and the exhibit was in charge of C. P. Weekes, Hercules sales representative and manager of the eastern territory, assisted by A. B. Wehling and John Carnahan.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention Rock Products.

Motors. Bulletin **No. 1150** on Hytork synchronous motors for cement mills and applications requiring high starting torque with minimum current from the line. Illustrated with photographs of installations in various cement plants. ALLIS-CHALMERS MANUFACTURING CO., Milwaukee, Wis.

Brass Products. Booklet covering Dole brass products, including double compression couplings, ball-roll couplings, flared tubing couplings, needle seat shut-off valves, priming cups, brass pipe fittings, built-in thermostats, leakproof primers, radiator air valves and radiator vacuum air valves. THE DOLE VALVE CO., Chicago, Ill.

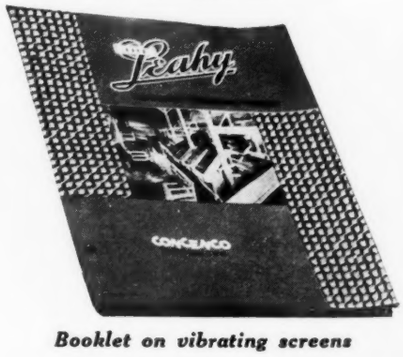
Portable Belt Conveyors. A new folder, **No. 1248,** describing the "Cub" portable belt conveyor, its various parts, and giving a comprehensive list of the industries in which this type of machine has been used for handling various materials. The folder gives complete specifications and shows illustrations of the machine at work under many conditions. LINK-BELT CO., Chicago, Ill.

Pyrometers. A new catalog, **No. 15A,** featuring theory and practice of applied pyrometry, together with descriptions and illustrations of all instruments, thermocouples, protecting tubes and other Brown indicating, recording and automatic control pyrometers, giving a comprehensive resume of the required equipment. THE BROWN INSTRUMENT CO., Philadelphia, Penn.

Water Stills. Catalog **"B"** covers the complete line of Barnstead automatic water stills. The book is divided into seven sections. Section one is a handbook of water-distilling equipment for all purposes, section two—water distilling equipment for general laboratory and industrial requirements, and the balance of the book covers water-distilling equipment for various industries, including the nonmetallic mining and quarrying industries. BARNSTEAD STILL AND STERILIZER CO., INC., Boston, Mass.

G-E Bulletins. Bulletin **GEA-38B** on direct-current crane and hoist motors, Type CO-1820, with such notable features as extra-heavy shafts and bearings, cast-steel frames split horizontally, and large base. **GEA-1152A** on synchronous motors for industrial pump and mine pumping. **GEA-1172A** on the super-synchronous motor for large grinding and pulverizing mills, described as a simple, compact and efficient unit combining the operating characteristics heretofore only approached by utilizing a cumbersome clutch together with a synchronous motor. **GEA-1277** on fractional-horsepower motors series wound, Types BA and RSC, for alternating-current and direct-current operation, applicable to a large variety of small devices operating over comparatively short periods of time. **GEA-1303A** on general purpose squirrel-cage induction motors with open, horizontal frames, two-phase and three-phase types, standard speeds, 220, 440 or 550 volts. **GEA-1318** describing a quartz-rod thermostat for use with metal-melting pots, for application where very close control is not necessary. For example, to control the temperature in lead, tin, solder, babbitt and other soft metals. GENERAL ELECTRIC CO., Schenectady, N. Y.

Vibrating Screen. Bulletin **No. 12-E,** illustrated here, covering the Leahy No-Blind Vibrating Screen, is an unusually attractive and completely informative booklet, and gives an able presentation of the kind of information, both theory and practice, that especially interests the operating man. In describing the Leahy screen itself, considerable attention is given to the theory underlying principles of the screening art. The pictures throughout the bulletin aptly show methods of installation, some of which are out of the ordinary. The bulletin is more or less of a textbook on commercial screening practice. THE DEISTER CONCENTRATOR CO., Fort Wayne, Ind.



Booklet on vibrating screens